MAY 28, 1955
VOL. 148—NO. 22

Telephony®

THE JOURNAL OF THE TELEPHONE INDUSTRY

DEW LINERS USE "HAMS"

DEW Line employe spends off-duty time at Line's amateur radio transmitter hoping to reach relatives in U. S. "Ham" radio is prime morale booster, affording DEW Liners a "voice" to home and friends. Story on page 40.

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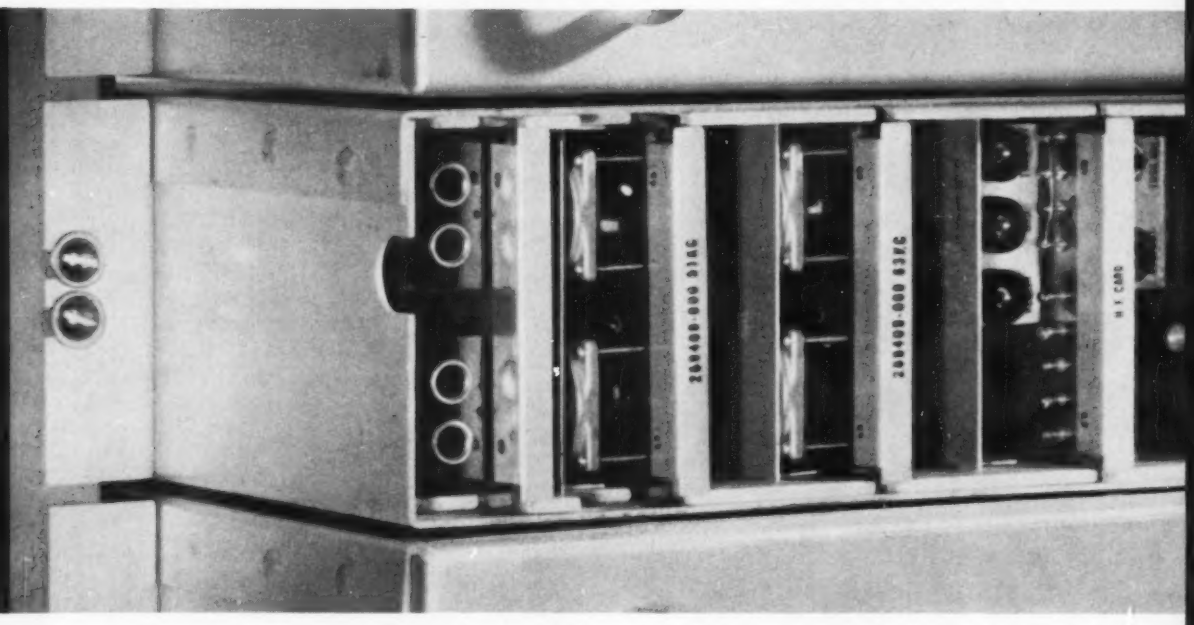

Transistorized Trunk Carrier by Stromberg-Carlson

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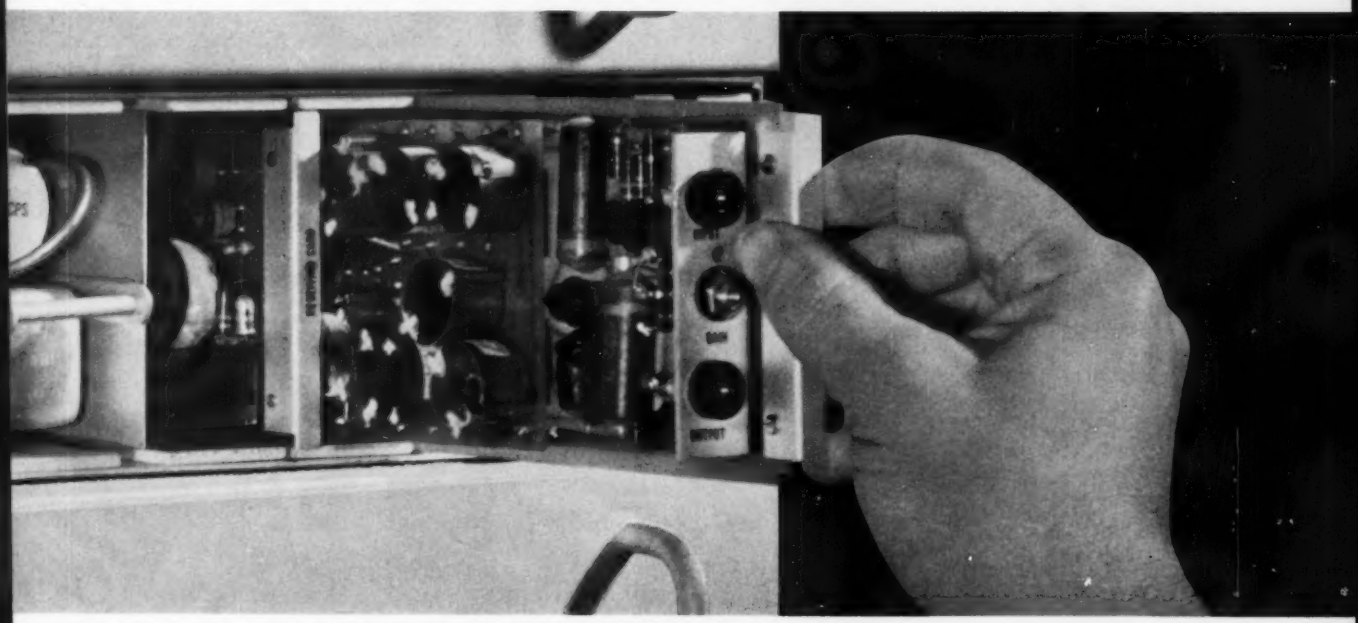

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3. You get transistorized circuitry that has been thoroughly service proven.
4. You can use "565" Carrier directly with E and M trunks without adapters.
5. If you also use "561" Subscriber Carrier, you enjoy the tremendous advantage of componentry that is interchangeable between the two systems.

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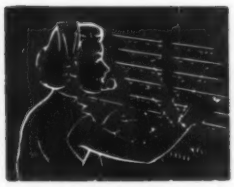

FLASHES AND PLUGS

TURNING BACK TIME IN FLIGHT. "A telephone display featuring a new telephone, equipped with push buttons instead of a dial was being shown to a group of youngsters. One of them didn't seem to be terribly impressed.

"Apparently, he had been on a visit to a small town where he had witnessed what he thought was a far greater telephonic marvel than the key set.

"With this new system, the boy explained, one merely picked up the handset and an operator answered and got the number for you."—*Blue Bell of Canada.*

•

THE GRANDEUR THAT WAS. Among traditionally title-conscious Germans, the struggles for simplified telephone directory listings in West Germany are reported to be a sad deprivation.

But the telephone books had expanded to such proportions that abbreviations had to come. Now, the basic reform of the post office department, which runs the telephone service, allows each subscriber a mere two academic titles, and these must be abbreviated. No more the Herr Doktor Doktor, with his many degrees and titles!

Also, only two indications of the subscriber's business will be allowed. The listing of a small company as "chestmakers, barrelmakers, sawmill, timber merchants, wholesalers and retailers of coal and heating oil," alas, for the proprietors, must shrink to just "timber and fuel."

•

SURPRISE, SURPRISE! In Colorado, stormy rains ripped away part of the paper on a large billboard advertising some of the telephone company services there.

Beneath the torn outer paper was an old Christmas message sponsored by a local mortuary.

The result was this stirring message: "Peace on Earth . . . Find it Fast in the Yellow Pages."—*The Blue Bell* of the Bell Telephone Co. of Canada.

•

TAKEOFF RECORD SET! The Associated Press reported recently that in Lockport, N.Y., a raccoon apparently had little interest in the efforts of utilities workers attempting to rescue him from his perch atop a 40-foot pole.

When his would-be rescuers approached, Mister Coon merely took flight—he leapt the 40 feet to the ground, and none the worse for his leap, he waddled off.

If raccoons demonstrate anything by pole-sitting, perhaps, this one thought it had been demonstrated sufficiently.

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Please notify your local postmaster and the Circulation Department of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

May 28, 1960

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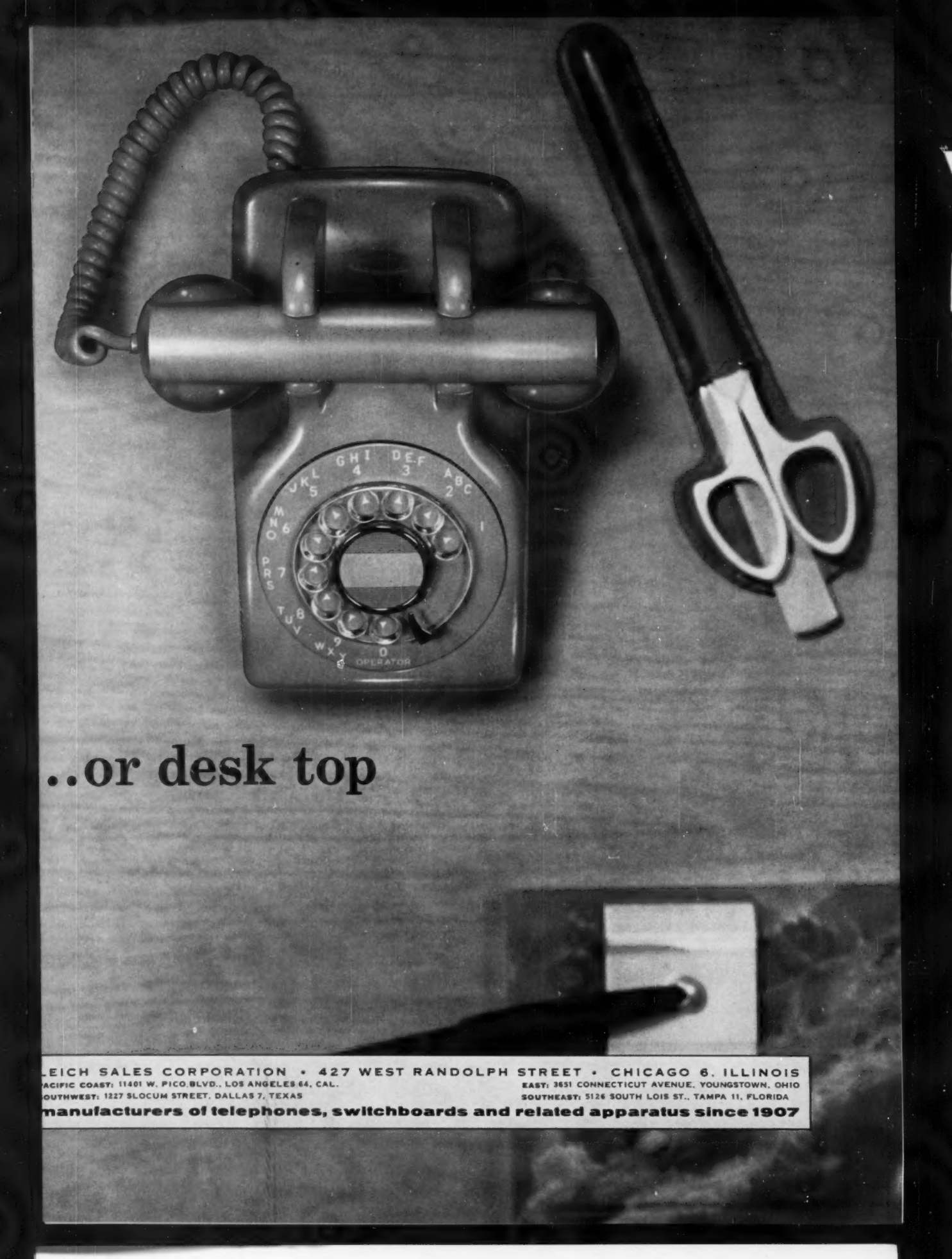
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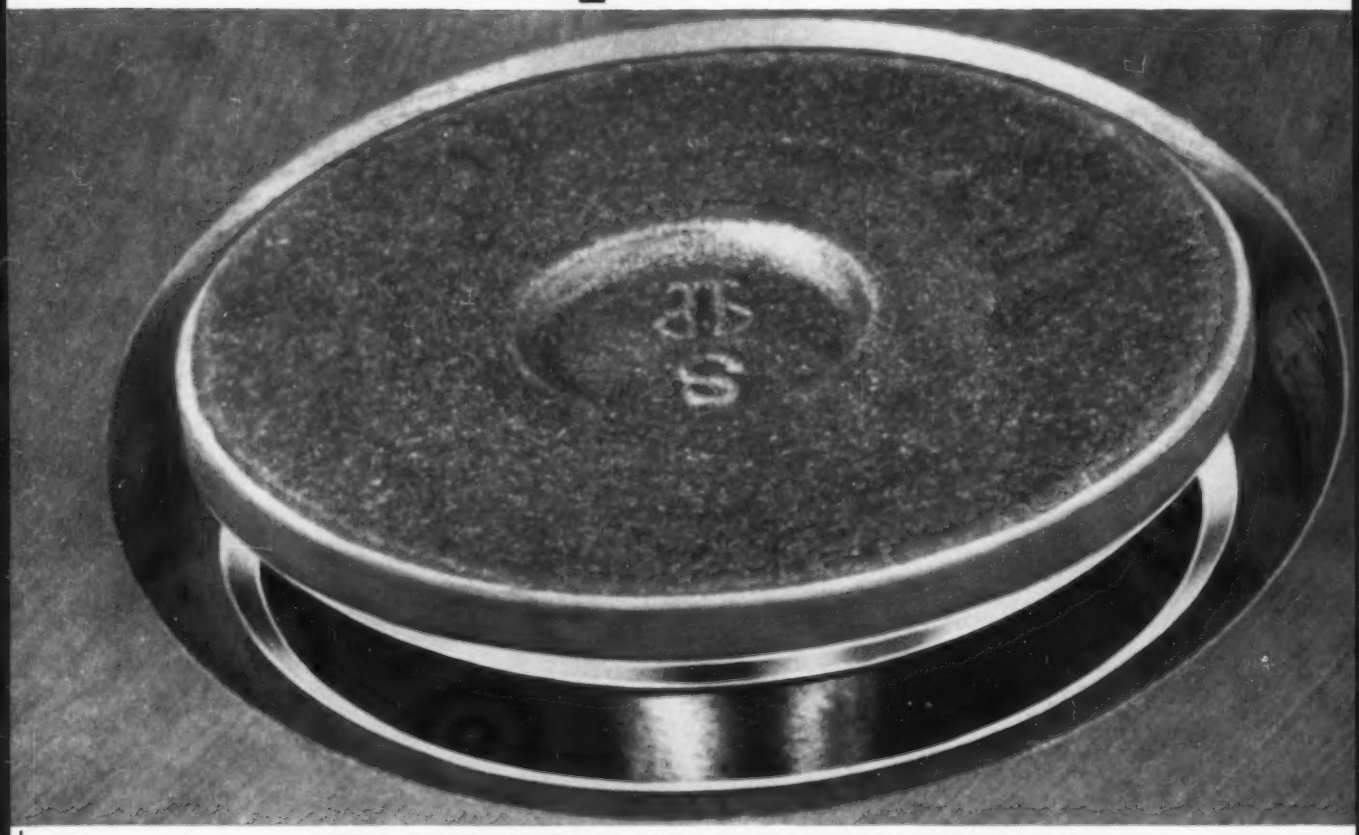

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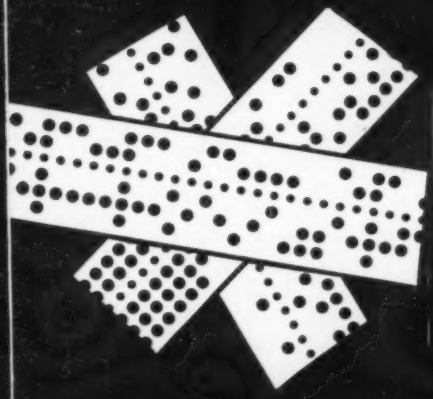

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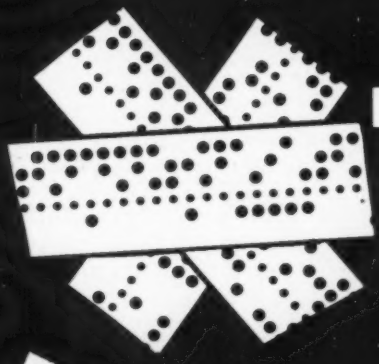

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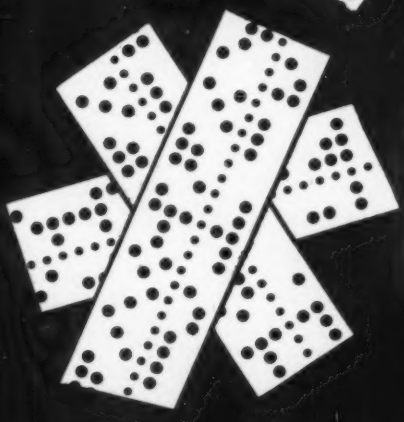

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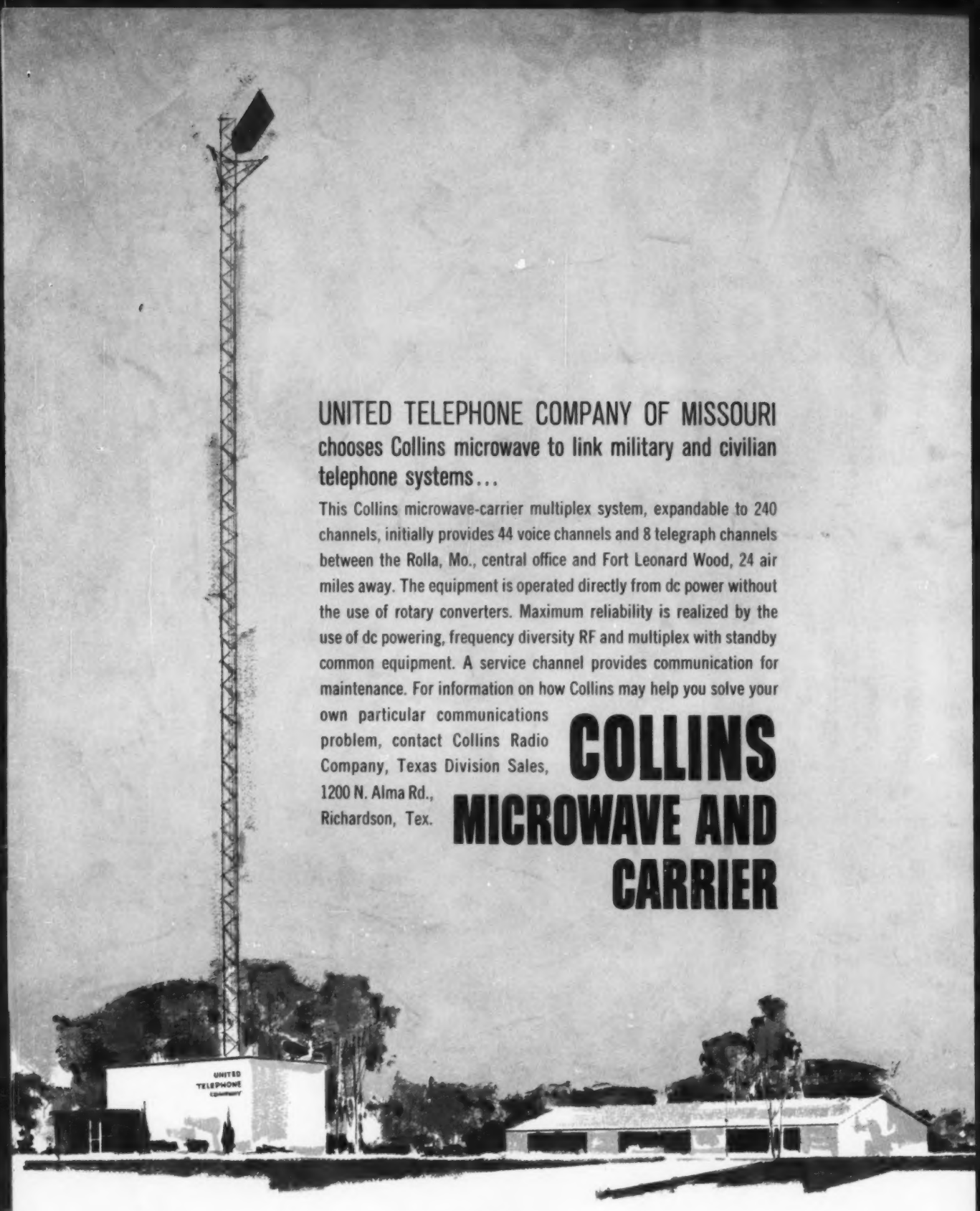

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

Congress considering alternatives to independent commission regulation. . . . Ministerial regulatory setup leads to customer irresponsibility and political decisions by the regulator. FCC reopens 890-megacycle case. Job of meter reading may fall to telephone companies in future.

TWO WEEKS AGO in this department there was discussion of dangers which could grow out of proposals to do away with independent commission regulation. Some of these proposals are now before Congress and the continued drumfire of criticism against the federal commissions increases the hazard of unwise and hasty Congressional action.

As was pointed out in this column, the immediate alternative to an independent commission setup is a ministerial regulatory setup. This places the responsibility for utility regulation under a politically appointed administrative department. As practiced in Europe and Latin America, such regulation becomes a form of "fiat control" in which the utility rates are fixed by bargaining rather than constitutionally required considerations of equity and fair play.

The utility company soon finds it is in a less favorable bargaining position; whereas the government regulator, unhindered by any constitutional inhibitions, is in a stronger bargaining position. The political regulator tends to look, more and more, for his support to the masses who put the government in office. And the masses in turn tend to look on the utility services as something to be given to them simply because they are alive, or at least living in the community, whether they can pay for them or not. The spirit of ethical responsibility on the part of the individual citizen is accordingly weakened.

Public utility companies in some of our larger cities have already come in contact with this attitude on the part of the underprivileged and uninformed. Some of the people moving into these cities from other areas and promptly moving onto the public assistance rolls expect public utility services along with everything else. When they cannot, or will not, pay bills, they express amazement and indignation when the public utility company threatens to cut off the service.

Such is one of the long-range consequences of putting public utility regulation into the sphere of political control rather than under independent commissions. It means an inevitable weakening of the individual's responsibility for his service demands. As long as the average citizen is aware that his utility service is the creation of his own consumer demand, he is usually ready, willing, and able to pay for it, on a reasonable basis.

Independent commission regulation stresses this obligation of the customer to pay a fair price for the cost of service furnished for his benefit. It also stresses the corresponding public service obligation to the utility company to meet the customer's demands with an adequate and reliable quality of service, not overlooking suitable and timely provision for future needs.

Independent commission regulation, in other words, depends on an equitable relationship between those who provide utility service, on the one hand, and those who use it, on the other. There is a "quid pro quo"—which has an inevitable effect on the attitude of the customer. He naturally expects to pay his just share for modern quality service, just as he expects to pay his grocery bills, his department store accounts, or any other honest debt. He wants no favors, no special treatment. Above all, he wants no charity. He has a sense of personal significance and dignity as a person.

The utility company likewise assumes the attitude of bearing its proper share of the service load under such an impartial system of independent regulation. It expects to pay just taxes, reasonable wages, fair prices for materials, plant, and other requirements. It wants neither financial subsidy nor political preference.

What happens when the utility services are shifted into the realm of political control? A psychological change seems to come over the utility-customer relationship. The utility management is no longer in a position to demand any more than the political overseer is willing to allow. And this is true whether the service continues under ostensible private management (subject to ministerial control) or whether it is sooner or later converted to outright public ownership and operation.

The effect of this changing relationship on the customer, however, is the most striking! Gradually lessened is the independent spirit and responsibility of the customer willing to pay his own way. Gradually he expects privileges and benefits in return for (or by very reason of) his political support of the government in power. Utility service becomes converted into a sort of welfare service, to which he is entitled as a matter of civil right—just like free public schools, highways, charity hospitals, social security, etc.

One need only ride on the poorly kept-up and occasionally filthy subways of New York City to realize the end result of a political policy of keeping the rate for service down regardless of

all other economic consequences. The mobs who roam the streets of Havana and some other Latin American cities, shouting their support of popular dictators promising them the moon in the guise of a welfare state, are infected with this spirit. Private enterprise in utility service cannot long survive in areas with such an atmosphere. Indeed, expropriation if not confiscation of private utility property is the usual consequence.

Quality service? Modern up-to-date technology and research for future service? Who wants it? Who needs it? The utility, or the government, or "somebody" is expected to provide these on a *welfare* basis! And if the particular customer cannot pay, the government is supposed to look out for him "somehow."

As for a fair return to the private utility owner, the political regulator can just laugh. The company is supposed to charge the rate which the government fixes, or "get out." In fact, sooner or later it is likely to be told to "get out," anyhow—and let the "people's government" take over the responsibility for these essential government services. The "Yankees" may have built them, and developed them; but now the "Yankees" are supposed either to run them on a charity basis, or "get out" and take token payments in the form of 100-year bonds, payable in wallpaper pesos—or something like that.

Such are the fruits of political control as compared with independent commission regulation. May Congress think long and hard before it takes the first step along that well-trodden road to eventual socialization.

Reopen the 890-Megacycle Case

The Federal Communications Commission on May 18 surprised a good many people by deciding to reopen the 890-megacycle radio frequencies allocation case. But, surprised or otherwise, the development was hailed with a good deal of satisfaction by the telephone industry. Actually the hearing record of the commission investigation of frequency allocations above 890 megacycles closed more than two years ago. And the commission has been sitting on the record ever since. But meanwhile a good many things have happened, including all sorts of developments in space communications, missile and satellite experiments, and other possibilities, both military and civilian.

So the FCC showed considerable foresight in reopening this case in order to give some additional study to these changes which are taking place so rapidly in the field of radio communications. The record so far contains no testimony at all regarding radio frequency needs for space communications. And, since the record closed early in 1958, there have been these phenomenal advancements in space technology which we see exhibited in missile guidance.

A statement issued by the American Telephone and Telegraph Co. on May 19 said that these advancements in space technology

". . . point to coming space developments in precision weather forecasting, manned satellites, navigational aids and world-wide communications.

"These new developments, all-important to national defense, will add significantly to the requirements for radio frequencies and multiply the complexity of the problem of too many radio channels required and too few available in the usable portion of the spectrum."

The FCC action was taken by Chairman Ford and Commissioners Hyde, Lee, Craven and Cross. The order stated:

"The commission granted requests by the American Telephone & Telegraph Co. and the General Telephone Service Corp. to the extent of:

"(1) Reopening the record in the proceeding on allocation of frequencies in the bands above 890 Mc (Docket 11866) for the limited purpose of receiving available information by July 8 on frequency needs for space communications.

"(2) Scheduling oral argument on July 18, to be limited to a 15-minute summary presentation of written statements and exhibits by each witness called by the commission.

"The current and specific factual data submitted by interested parties should be responsive to eight matters appended to the order.

"This action was taken without prejudice to any action which the commission may take on pending petitions for reconsideration and other pleadings in connection with the July 29, 1959 report and order in Docket 11866.

By a separate notice of inquiry, the FCC called for initial reports by Mar. 1, 1961, as to frequency needs for space communications on a longer-range basis, in view of the expected rapid developments in space communications. This technical information will assist the commission in its preparatory work leading to a United States position for future international conferences on space communications needs.

Subsequent reports may be filed upon dates to be specified by future orders

(Continued on page 40)

TELEPHONY to Publish Signal Corps Issue — Order Your Copies Now

On June 21, the U. S. Army Signal Corps will celebrate its 100th anniversary—a century of service to the Army and the nation.

The Signal Corps has a unique record since its founding on June 21, 1860 by an Army surgeon, Maj. Albert J. Myer, the first Chief Signal Officer of the Army. Its praiseworthy accomplishments have been supported by both American fighting men and civilians here and abroad.

TELEPHONY will devote the entire editorial space in a special issue, dated June 18, to observe the Signal Corps' 100 years of progress in the science of Army communications—an advance from colored signaling flags to a communications satellite relaying voice and teletype messages from outer space.

Interest being shown in this special Signal Corps issue at this early date indicates there will be a great demand for copies on the part of members of the Armed Forces, and telephone operating and manufacturing personnel.

To insure the printing of a sufficient number of copies of the special issue to meet the demand, we urge those desiring copies to fill in and send to us the order blank below:

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Chicago 5, Illinois

Enclosed is remittance for $_____ to cover _____ copy(ies) of your special Signal Corps issue (June 18) @ $.50 per copy.

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PROFIT MANAGEMENT

By L. E. Lattin*

PROFIT is what you get for taking a risk—in the event it turns out all right. Risk has been likened to the perils of a voyage; of a ship sailing for a foreign port with a cargo of merchandise.

All manner of things may happen. The bottom may fall out of the market. The crew may mutiny. Somebody may come up with better goods. Even the ship may go down.

After the voyage is over and all the expenses and wages and goods are paid for and taxes turned over—after that, if anything is left, it is profit.

Risk Entitled to Profit

In all of this it is the owner who takes the risk and who is entitled to the profit. If he borrows some money he risks that, too, just as much as he risks his own money, and it's only unfortunate that he has to pay some of it out in interest to the lender. If the boat goes down the lender doesn't rush out and say, "Here, I will pay my share," does he?

And, then, there was the fellow who was a fisherman and he thought his boat might go down some day, or wear out, or catch fire, or something—so he was smart and put some money in the bank so he wouldn't be out of business in such an event.

His son Tony eventually grew up and the old man thought what a nice thing it would be to buy Tony a boat too. So he took out the money in the bank and borrowed some more and bought another boat.

And just then they declared fishing to be a "public utility" and said, "On the borrowed money you can earn (What a word!)—you can earn only enough to pay the interest." The old man says in his best Portuguese, "O, Mama Mia, I only get to earn on half a new boat?"

"But, no," they say, "you don't get to earn on that either, because that belongs to the people who bought fish."

Cost-of-Money Theory Fallacy

You can see that I belong to an old school that believes that the utility is subject to laws of property that are no different from the laws that govern other citizens. I believe, in short, that the owner risks the entire productive capacity that goes into the enterprise—whether or not it is a public utility. The theory of the cost of money is not a theory at all, but an outright fallacy.

Profit in the American System is what makes the mare go and you as an American businessman are just as much concerned with the profitable management of the plant that is bought with loans or reserves as you are with profit on the money you put into the business yourself. You can't separate the responsibility and you can't separate the rewards—you have to risk and manage the whole shebang.

Finally, any business that does not make a profit, whether it is a utility or a meat market, is neither a good place to employ money, nor people, nor to buy hamburger.

Now, I should like to proceed with some of the mechanics of profit management.

By way of illustration that your problems are not too different in principle from mine, I have thrown together some figures which undertake to compare the structure of my company and some other Independents—both reduced to about 10,000 telephones *(See Table 1, page 20)*.

You will observe that since General (of California) is 100 per cent dial we have somewhat higher investment, depreciation and taxes than these particular Independents (referred to in *Table 1*) and somewhat less expense in the categories largely affected by labor.

Now, the whole purpose of this statement is shown at the bottom of the table.

Think in Profit Terms

One of the most valuable lessons I have learned in profit management is always to think in terms of profit in everything that we do. And everything we do affects investment or revenue or expense.

Take a look at that $31,000 figure at the bottom of the first column. What this means is that if you raised invest-

*Mr. Lattin is President of General Telephone Co. of California, Santa Monica, Cal. He presented this address at the Feb. 4 convention of the California Independent Telephone Association.

L. E. LATTIN

ment $31,000, and nothing else happened, your rate of return to total capital would drop 0.10 per cent. Also, if you dropped revenue, or increased expense $7,000, it would reduce return by 0.10 per cent. Somebody will say that if you raised investment, taxes and depreciation would go up with it. Sure, and just by illustration, if these charges were 10 per cent on the $31,000 this would be $3,100 of additional expense and that would reduce the rate of return altogether by almost 0.15 per cent.

This doesn't have to be accurate right down to the point of nastiness to give you a practical rule of thumb by which to judge propositions that come up from day to day. In a very friendly fashion, I urge you to develop these figures for your company and to think always in these terms.

Now, I should like to go on to some discussion of revenue control, investment control and expense control.

Revenue Control

In our regulated business we never have given enough attention to the necessity for revenue control. We have been prone to think of revenue as a part of a budget which is the product of an estimate of stations and the level of rates which the regulatory commission will allow.

Real revenue control, however, depends primarily upon a dominative marketing and sales concept—not the promiscuous, hit and miss, employe sales type of thing, but rather a deliberately planned and executed system of revenue development.

I will admit that it is absolutely essential to the development of such a marketing management to have a proper structure of rates. I am not speaking here primarily of the level of rates, but rather the distribution of the charges. There must be built into this structure the incentives to sell and control rather than to just take orders and wonder what the future holds.

I recognize that the cost factor in providing a given service is important in pricing but, slavishly held to, it can and will destroy initiative in the development and sale of improved services and equipment.

Residence is Feeder Service

First of all, business service should be expected to make a better profit than residence service. Residence service is the "feeder" service. To a very large extent the very value of business service depends upon the fact that there are telephones in residences. Moreover, the burden of charges rests more lightly as a tax deductible business expense than as a charge upon the "consumer pocketbook." Especially is this so if the business enhances its profits, as it does, through the use of effective communications.

	Some Other Independents	*General of California*
Total Telephone Plant	**$3,800,000**	**$4,435,000**
Where it came from		
Depreciation Reserve	$ 670,000	$ 664,000
Common Stock	1,260,000	1,828,000
Long Term Debt	1,360,000	1,797,000
Surplus	200,000	162,000
Short Term Debt	260,000	
Other Liabilities (Net)	50,000	(16,000)
Total Capital	**$3,080,000**	**$3,787,000**
Revenues		
Local	$ 515,000	$ 883,000
Toll	475,000	250,000
Other	75,000	40,000
Net Bad Debt	15,000	13,000
Total	$1,080,000	$1,186,000
Expenses		
Maintenance	$ 200,000	$ 178,000
Depreciation	140,000	180,000
Traffic	160,000	72,000
Commercial	100,000	71,000
General Office	90,000	107,000
Other Operating	40,000	26,000
Total	$ 730,000	$ 634,000
Total Taxes	$ 173,000	$ 304,000
Available for Fixed Charges	$ 177,000	$ 248,000
% to Total Capital	5.75	6.55
Fixed Charges	$ 74,000	$ 52,000
Net Income	$ 103,000	$ 186,000
Debt Ratio	52%	47%
Reserve to Total Plant	18%	15%
Revenue to Total Plant	28%	27%
Operating Expense to Revenue	68%	53%
Net Income to Equity	7%	9%
Surplus to Common	16%	9%
For .10% on Return		
Capital	$ 31,000	$ 38,000
Revenue or Expense	$ 7,000	$ 8,000

Table 1

A proper profit margin on business service gives the incentive to develop and sell new and better services and, at the same time, places an element of control in the hands of management.

In my company, during the past year, we have organized a business service marketing and sales group with 125 people and currently we are running at the rate of over $500 in additional recurring annual revenue per day for each salesman. We figure that we are adding stimulated business revenue at the rate of over 5 million dollars per year, and this is no inconsiderable sum.

Even within the basic residence services it would seem to make good sense to make sure that individual service is more profitable than party line service.

The same principle of profitability should apply to the pricing of optional services, as compared to rates for basic services. We should look over our rates for the whole gamut of things, from additional listings to Electronic Secretaries, to make sure that the profit incentive is built into these marketable items.

Given full scale sales-for-profit incentive the companies might vastly enhance the scope and value of communications service and, in the long run, slow down or even reverse the rising spiral of basic services. I urge strongly that this idea be given sympathetic consideration by the regulatory authority.

As a distinct category of optional services, I most definitely include toll service.

Toll Revenues

The California commission, which is in the forefront of enlightened regulation in this nation, wisely has allowed that the rate of return on long distance service should be higher than on exchange service.

This brings me to another important phase of revenue control, namely, progress in securing a more equitable

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apportionment of toll revenues between the toll operating companies and the exchange operating companies.

It is an anomaly that during the past three decades, in which a spiral of inflation has been ever present, interstate toll rates are lower than when there was a good nickel cigar, intrastate rates have been only moderately increased, but basic exchange rates have had to be increased time after time. I dare say that if there had been but one telephone company under but one regulatory jurisdiction during all of this time, the pricing would have realistically recognized the principle of deference to the feeder services and not the other way around.

Please believe me, I am not advocating that there be but one telephone company and one regulatory jurisdiction—we came close enough to this as it was.

What does really amaze me is that the element of profitability never has entered the equation in settlements between companies for the use of exchange facilities for the origination and termination of toll calls within the local exchange. Perhaps I should not be so amazed since it took a good many years to get any recognition for the fact that there should be any compensation at all for the toll use of exchange plant.

Value Depends on Earnings

With regard to regulatory matters, the most significant (U.S.) Supreme Court decision of recent years was the Hope Decision in which the court said that value is the end-result of the rate making process. In other words, the decision stated that the value of a utility property is dependent upon what it is allowed to earn.

Then, does it not follow, as morning follows night, that if toll earns 8 per cent and exchange earns 6 per cent the plant utilized for these purposes has a corresponding range of values? In this example, actually, if the Supreme Court of the United States is correct, your instruments, cables and switches when used for toll have a value one-third greater than when they are used for exchange service.

Furthermore, all things being equal, toll service should have a higher rate of return because of its optional characteristic and because of its greater variability. But all things are not equal, because the message minutes use theory conveniently passes the variability over to the exchange service operation. When toll message volume goes down, the plant that was there to carry the volume is still there, should continue to be classed as toll and not reclassified to exchange. The exchange operator cannot conveniently make it disappear, and exchange costs should not be burdened because toll volume went down.

I didn't come here to make a speech on toll settlements but, nevertheless, the California commission looks upon this as a proper function of management in revenue control.

Investment Control

I want to move on to the subject of investment control. The reasons for emphasis upon all phases of revenue control will be a little clearer as we get into this subject, particularly as it relates to marketing and sales, because good profit management demands effective coordination of revenue and investment control.

Investment in fixed assets is the Achilles Heel of the telephone business. It is a fact, mathematically, that the impact of inflation on investment is in direct proportion to the turnover through sales. A telephone company turning its investment only once in three years, say, is six times as hard hit by the rising unit cost of productive facilities as is the business which turns its investment over twice a year, which is common.

It goes without saying, therefore, that investment control is extremely important. There are several facets to this problem which we could talk on at great length, including general overhead, engineering, manufacturing and delivery time, installation costs and plant utilization.

Obviously, it would be presumptive on my part to lecture you on general overheads, because this comes too close to where you live and have your being.

Engineering Like Insurance

Something of the same sort might be said about engineering. However, there is a philosophy about engineering that I should like to expound. I look upon engineering in our business as the price we pay to avoid the cost of ignorance and error in the assemblage of telephone facilities. It is something like insurance. To never make a mistake may be too costly. As a general proposition I would rather have a million dollars in plant out there somewhere than to have a million dollars worth of capitalized dissertations and blueprints. Never making a mistake is a worthwhile objective in fundamental design, but it can be very costly in quantitative economics. I will come back to this a little later.

Another thing I question a lot about engineering is how much of it is really engineering and how much is paperwork, filing and computation. However, I want to get away from these general observations and get down to brass tacks on some practical problems.

First of all, we can control construction costs to some extent by better plant design, and by labor-saving methods or machinery, and these have been coming along as the pressure of investment has been upon us.

But, for immediate results, we need to get an honest day's work for an honest day's pay. For this, we need not only a dollar budget but an employe budget. We need to have managers on whom we can place the responsibility, and we need to account for performance. We need continuing property records in which unit costs are spelled out, and we need to arrive at operable objectives as to improving standards of performance. We come back to people again. They will respond if you have the slightest idea of how they're doing.

Better Plant Utilization

But, perhaps, more important than all of this is better plant utilization—getting the revenue dollar closer to the investment dollar in point of time. I used to hear telephone men say after the war that some held orders were a good thing. Why? Because, they said, when you put in some plant you fill it up with service, right away and start getting the revenue dollars quicker. This general idea makes sense, but that is no way to run a public service kind of business.

One day a city slicker was out investigating a railroad wreck. He found a farmer who had been an eye witness and the conversation went something like this:

"What happened?"
"Wa'll, I looked up the track and I seen No. 13 coming down hell bent for election. Then I looked down the track and here was ole No. 24 coming hell bent for election."
"What did you do?"
"Couldn't do nothin'."
"Well, then, what did you think?"
"I thought that was a hell of a way to run a railroad."

So it was and so must we find ways to get revenues closer to investment without wrecking the public service we are obligated to perform. A little while ago I said quite a bit about marketing and sales having the advantage of giving us control of the business. I want now to bring this idea to bear upon the subject of investment control.

For this purpose I should like to urge upon you that we need a convenient unit of plant and customer geography in which we can exercise these dual controls.

In our outside plant, we have three general categories: The main cable

(Continued on page 46)

CARRIER TECHNIQUE—NOISE CONSIDERATIONS

IN A PREVIOUS ISSUE of this magazine, a method of predicting signal-to-noise ratios at a given frequency on carrier transmission facilities was discussed. This was accomplished by correlating previously computed or measured transmission facility attenuation characteristics, transmitted signal power, and noise power. As was pointed out, it is also possible to determine the level, frequency, and type of interference to be expected on a given channel at the point in the circuit where connection is normally made to the telephone switchboard or some other terminating instrument (voice frequency drop).

Other conditions must also be considered. In many instances the apparatus to be connected to the facility may not be as susceptible to one frequency as another, or on the other hand may be more susceptive.

NOISE WEIGHTING EFFECTS

Bell Telephone Laboratories and other large research organizations conducted considerable research on the interfering effects of noise. On special telephone hookups, large numbers of listening tests were conducted by different persons, using the same telephone instruments, while different interfering frequencies were coupled into the hookup.

This tone was removed and a 1000 c.p.s. tone was injected. The level of the 1000 c.p.s. tone was then adjusted until it resulted in the same relative interference effect. From the resulting information, various curves were plotted. These were referred to as weighting curves. Fig. 1 is typical of these curves which were plotted and is referred to as the F1A Line Weighting Curve.

By studying this curve, it will be noted that the interfering effects of different frequencies are relatively different. Thus the interfering effect of some noise coupled into the transmission system may have little effect; that is, a low signal-to-noise ratio may not be as undesirable as at first considered.

In many instances, however, the apparatus to be connected to the facility may not be the F1A handset; it may be apparatus that has relatively flat weighting or, in any event, has different weighting than that described above. Thus, it is necessary to consider the apparatus' relative response to certain noise frequencies, when considering the effects of noise interference.

MICROWAVE INTERFERENCE

TELEPHONE communications, especially those relating to long-distance communications, have grown at a rapid rate over the past decade. Many of these communications have been and will continue to be expanded through the art of carrier or multiplexing on microwave. This is particularly true where large circuit requirements over considerable distances are to be established.

During these same years, many of these large circuit requirements have been created by the government in its defense and administrative operations. Many radar sites have been established throughout the North American continent in the interests of these defense maneuvers; communications networks connect-

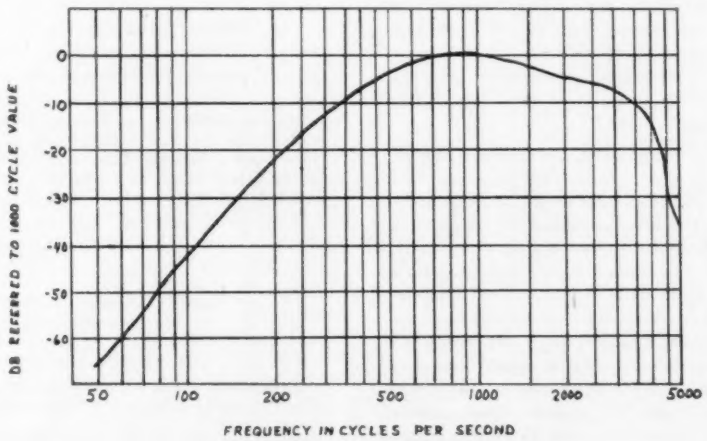


Fig. 1. F1A Line Weighting.

ing these major defense installations are being provided by telephone companies. Many of these facilities are also being provided by microwave.

In many instances, installation of microwave terminal equipment or microwave repeater equipment is negotiated within short distances of these powerful radars. What are the effects that these powerful radar stations will introduce into microwave communications networks?

Even though radars operate on frequencies outside the common-carrier band there are ways in which radars may often interfere with radio operating in the common-carrier band, such as by harmonics and spurious emissions of the powerful radar pulses.

R. L. Robbins, of the Bell Telephone Laboratories, recently discussed "Radar Interference With Microwave Radio" in an article published by the Bell Laboratories *Record*. In the article, Mr. Robbins explained the various courses of action taken by the "Lab" in analyzing the effects of radar interference on microwave transmission, and the possible reduction of such interfering effects.

In describing laboratory experimental arrangements, he said, "The laboratory experiments simulated an interference condition by injecting a pulsed microwave signal (representing the radar interference) into a receiver with a signal from a microwave transmitter (representing the desired transmission). By using an assembly of wave guide couplers and variable attenuators, engineers were able to adjust independently the strength of each of these signals at the receiver input."

Mr. Robbins said test results indicated, "As the peak value of the interference signal approaches the peak value of the desired signal, the interfering noise in telephone circuits rises rapidly." Other results showed: "The noise is negligible when the ratio of peak signal to peak interference at the receiver input is more than 5 db, but is intolerable when the ratio is unity (0 db)."

Study of the effects of radar interference on data transmission, such as that used in the SAGE (Semi-Automatic Ground Environment) system, showed, he stated, "These signals are not seriously affected by radar interference when the circuits do not have too much interference for ordinary telephone usage.

"Similar tests with television signals indicated that they are more sensitive to radar interference than telephone signals. Here, it appears that the ratio of peak signal to peak interference must be greater than 15 db."

Mr. Robbins described a method by which laboratory engineers investigate radar interference:

"To investigate the radiation from radars in the field, laboratory engineers use a 'mobile' laboratory. They drive a test truck to a site having an unobstructed view of the radar. This site must have no apparent reflecting areas, such as a flat highway or pond, in or near the transmission path.

"They then set up a receiving 'horn' antenna on a tripod on the roof of the truck and aim it toward the radar by a simple optical sight. The testing engineer tunes in the main radar signal on his receiver and directs the radar operator to aim the beam of the radar precisely on the 'horn.' The engineer observes the radar signal on a signal-strength meter and on an oscilloscope.

"When aiming is completed, the engineer matches pulses from a signal generator with those from the radar in frequency, pulse length, and pulse rate; he also observes peak power received.

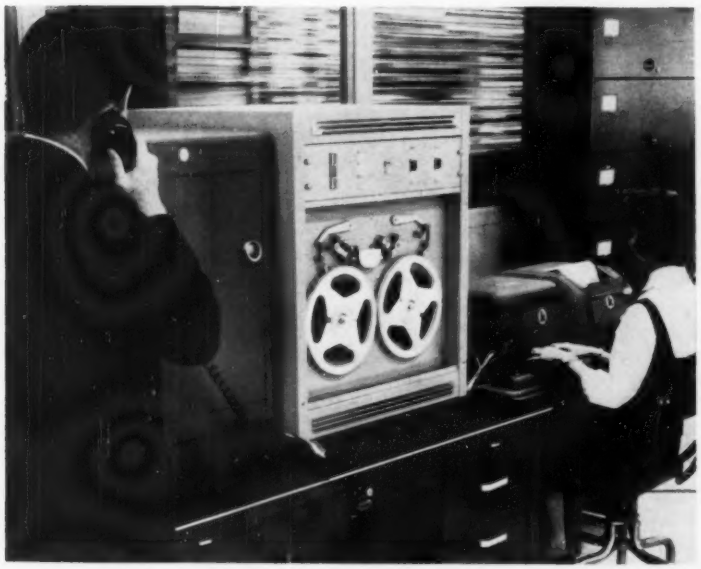
"He then determines the actual loss in the path from the radar to the test truck and compares this measured loss with the theoretical value. If the two are in agreement, the engineer proceeds with the tests.

"The engineer proceeds to scan the entire frequency band for harmonics and spurious signals. Should he find spurious emissions, he matches the signal generator to it. From this information, he can compute the effective radiated power of the radar at that frequency."

Below is a tabulation, which appeared in Mr. Robbins' article, which estimates the maximum tolerable interference power which may be radiated from a radar without causing interference to typical Bell System receiving systems.

INTERFERING EFFECTS

Radar's Location with Respect to Communications Rcvr.	*Maximum Tolerable Effective Radiated Power of Radar Spurious Output in dbms.*	
	Television Channels	*Telephone Channels*
Anywhere beyond a few hundred yards	minus 25	minus 10
On the same site, receiving antenna pointed away from radar	plus 15	plus 30
Anywhere, except along 1-mile corridor centered on microwave	plus 25	plus 40



Prototype of Avco Corp. Comex 104 highspeed data transmission communication system. By accumulation of information from teletypewriters or similar devices, it is possible to transmit this same information at 600 to 1000 words per minute.

DATA TRANSMISSION

A NEW CONCEPT in data communications, called Comex, that can transmit a 3000-word message over a telephone line in three minutes was recently announced by the Crosley Division, Avco Corp.

It is said that the completely transistorized device, basically a two-speed magnetic tape recorder/reproducer, has been designed to reduce time for transmission of data from devices such as teletypewriters, and paper tape transmitters.

The company states: "In operation, the output of a standard 60 or 100 wpm teletypewriter or similar device is fed into the 'Comex' tape recorder operating at slow speed. As much as 12 hours of message information may be stored in this manner prior to 'read-out.'

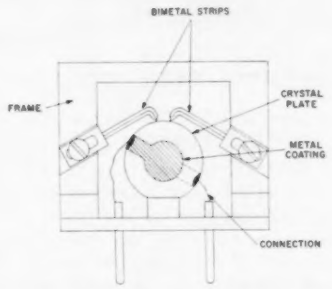
"A standard telephone facility is then established with a second 'Comex' unit actuated to receive information. The magnetic tape is run 10 times the slow speed as the data is sent over the transmission facility to be recorded on the tape of the distant unit. The recorded information is then fed into a teletypewriter or similar device at the slow speed and the message printed out.

"Modulation techniques compensate for distortion, phase delay, and impedance irregularities of standard telephone circuit facilities, thus making it possible to establish data communication over previously established long-distance service calls."

FREQUENCY STABILIZATION

THE USE OF OVENS or heaters as a means of controlling frequency drift of crystal oscillators is known to all in the communications field.

Many types of communications equipment depend upon precisely cut quartz crystals of various geometric patterns as a component of crystal oscillators, because of their highly predictable rate of oscillation. Even with the stability "built in" to the quartz crystal, temperature variations have a tendency to change the frequency of oscillation. This causes interference with other communications channels plus undesirable effects within its own service channel. For this reason, crystals are installed in thermostatically controlled ovens in order to maintain correct operating frequency.



Sketch illustrates the concept of a new stabilization device for use with quartz crystals in eliminating the effects of temperature variations on frequency stability.

In this space age, the crystal oven has created new problems:

(1) That of space due to the physical size of the oven itself.

(2) Since power is consumed in permitting the oven to function, that of additional space required by the power supply.

A new stabilization device to overcome the limitations of the crystal oven, providing real savings in weight, size, and power requirements has recently been announced by the Department of the Army.

The device—developed by Dr. Edward A. Gerber at the U.S. Army Signal Research & Development Laboratory, Fort Monmouth, N. J.—uses temperature-sensitive bimetal strips called "fingers" pressing against certain spots on the edge of the crystal.

Depending on the application, the "fingers" may number one or more. The "fingers" are made of two different metals having different rates of expansion and contraction and act to apply the proper amount of pressure as temperature varies, to maintain "on frequency" conditions.

ELECTRONICS BOOKS

DIRECT CURRENT ELECTRICITY
By Dr. Alexander Efron. 100 pages; $2.25.

This book constitutes Volume 9 of a "Basic Science Series." The text is a presentation of the basic fundamentals of direct current electricity with which every potential technician must acquaint himself prior to advancing to more complex theories, such as the fundamentals of alternating current and electron tube theory.

The text has been written in a thoroughly readable manner from a level suitable to the general student technician, to a point reached by the beginning student of engineering.

The initial chapter discusses electrochemistry, with the related ionization theory, laws of electrolysis, and analysis of secondary storage cells of the type installed in telephone plant.

Other chapters discuss in detail the concepts of series and parallel circuits; basic electrical direct current measuring instruments for measuring resistance, voltage, current, power and energy, and magnetic effects of electric current.

Numerous problems are given and the solutions resolved throughout the text with a list of supplementary questions and problems at the end of each chapter as a means of self-examination.

•

UNDERSTANDING MICROWAVES
by Victor J. Young. 304 pages; $3.50.

"Understanding Microwaves" is a comprehensive discussion of the fundamentals of microwaves, their generation, transmission, and application.

The material has been selected and presented in a manner which should be of assistance to all, including the engineer and the technician.

It must be realized that a text of this nature does have some mathematics, no matter how sharply the corners are cut, but wherever possible the mathematical concept appears in footnotes. Even then, solutions to the mathematical approach are detailed.

The early chapters explain the fundamentals of electrostatic and electromagnetic fields. Then radiation and reflection, transmission lines, Poynting's Vector and Maxwell's Equations are taken up. Later chapters discuss fundamentals of waveguides, resonant cavities, antennas, and microwave oscillators. A final chapter is devoted to such topics as propagation difficulties, noise figures, and feasibility of communication.

Quite often it is hard to find a text that gives a rigorous discussion on a subject such as this without going into something quite unpleasant to read. The text is recommended to those "breaking" into the microwave field and who already have a background in radio communications.

•

TRANSISTOR PROJECTS
By Staff of Gernsback Library. 160 pages; $2.90.

As the title indicates, this is a projects book. The book was written specially for the practical man and the hobbyist.

The projects represent numerous selections of the best of transistor construction articles from recent issues of *Radio-Electronics Magazine*. Each of the projects has been tested by the authors . . . and each one works.

The text consists of four sections covering transistor hints, building transistor radios and test equipments of various types; a final section is devoted to miscellaneous transistor projects. In the later sections of the text, projects covering the fabrication of sine-square-wave generators, transistor checkers, elec-

tronic counters, and others too numerous to mention, are detailed.

•

KNOW YOUR OSCILLOSCOPE
by Paul C. Smith; 151 pages; illustrated. $2.00.

The cathode ray oscilloscope is probably one of the most useful and versatile instruments to have around an electronics plant. However, even a simple scope has six or more terminals to which leads can be fastened, and at least 12 knobs to turn. Unless the operator knows exactly what he is doing, he may be baffled by the result.

This book, as the name implies, places emphasis on the scope itself rather than on its uses. While some illustrations are included, showing the application of the instrument to radio and television problems, more than half of the book is devoted to the oscilloscope and its inner workings.

It is a good book to have even if you already have several on the use of the oscilloscope. It is available from TELEPHONY.

Success, Profits

"Business profits are volatile, tumbling in recessions and snapping back in recoveries. . . .

"Profits are a residual, what is left over. They may be plus or minus. If a company that has lost money makes as little as a single dollar, its improvement runs beyond the bounds of percentage measurement.

"Over the years, business to succeed must make money.

"In an expanding private enterprise economy, it is necessary, and proper, that profits should reach new peaks — in common with other dollar magnitudes such as payrolls, sales volumes, invested capital, etc.

"The only fair way to size up profits is to compare them on an average basis and in relation to broader, stabler magnitudes.

"This becomes all the more important in a situation where money has been tending to depreciate in value and dollar magnitudes generally become swollen."—from an editorial statement in the *First National City Bank Monthly Letter, New York, N. Y.*

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Almost everyone admits that the rapid growth of electronics has created problems for telephone men. The skills of yesterday are still important, but they must be augmented with a new skill . . . electronics.

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*When you see our technical approach and training philosophy, we think you will agree that we have developed a "new way" of bringing training to you.

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THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

WE ARE indebted to M. P. Brown, vice president, sales, of the Taylor-Colquitt Co., wood preservers, for a brochure that presents an interesting word and picture story of a company which has pioneered in better methods of timber conservation.

During World War II, this company furnished the Signal Corps with approximately 110,000 poles which were shipped to the various theaters of operation. In Australia, and in various other parts of the world, extremely heavy termite attacks were encountered. It was learned that poles grown in the United States and pressure-treated with creosote could withstand this termite attack for years, as opposed to native trees which would break within a few months.

•

A recent issue of *African Life in Southern Rhodesia* carries a page advertisement of the East African Posts & Telecommunications Administration that states: "Reach for the telephone and save time and money." It also advises, "There are still certain areas where telephones are not yet available. The Administration assures those who are waiting for the service that every effort is being made to deal with the problem."

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The *Southern Bell Magazine* reports that in its territory, where ice and snow come infrequently and often melt fast, there were four Yankee-type storms in early March.

Employes in the northern sections of Louisiana, Mississippi, Alabama, Tennessee and Georgia found themselves coping with icy streets and snow-clogged driveways. Outside plant, weighted down with sleet, did not fare well in many parts of the south. More than 52 Southern Bell towns were isolated and had to resort to emergency power. More than 100,000 stations were out of order.

Restoration of service meant night and day work for plant men, and many crews were rushed into the storm areas to help with the job.

When the March storm cost was tallied, Southern Bell found it amounted to a cold, icy 3.4 million dollars.

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A new type of ladder, known as the "Bally-Hi," should prove useful in the communications field.

This new concept in ladder convenience (see cut) and safety consists of a 28-foot two-stage ladder mounted on a sturdy, wheeled frame equipped with collapsible outriggers. The aluminum extension ladder consists of two 14-foot sections. It provides a safe means of working at heights up to approximately 30 feet above the ground. Guard rails along the entire ladder length and a pulpit-type guard rail at the top enable the user to work at any level without fear of falling.

The supporting steel frame glides easily from one job to another on large 4-inch swivel type casters. At the ladder end, a locking device anchors the frame firmly to the ground when the ladder is stepped on. This lock will not disengage until the catch is released by pressure from the foot. A screw type leveling jack assures a steady, safe position even on a sloping surface. Outriggers on each side add extra stability and prevent tipping.

The frame is 70 inches high, 81 inches long, and 30 inches wide when the outriggers are collapsed against the sides. With outriggers unfolded, the width is 97 inches. The over-all collapsed height of the entire unit is 77 inches, permitting it to go easily through ordinary-sized doorways.

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Another advantage claimed for all number dialing is that political, geographical, and social boundries will no longer cause problems. Exchange boundries can seldom be made to agree with community lines, but their designations have a strange way of assuming class identification. GLenco 3-1234 might suggest a certain area, but 453-1234 probably would not.

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The General Telephone Co. of California has initiated a program to fingerprint all of its employes. High on the list of reasons for this program is the protection of employes.

In times of disaster, a fingerprint record could be invaluable in identifying employes who have been seriously injured, should other marks of identity be missing. Other reasons include customer protection, safeguarding of company's confidential material, and national security.

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Crosstalk: Inflation is described as a state of affairs when you never had it so good or parted with it so fast.

•

We are warned always to drive so that our license expires before we do.

"By George, you have to hand it to the Telephone Company!"

Drawing by J. Mirachi, © 1960 The New Yorker Magazine, Inc.

The buoy booth is humorous fantasy, but the phone booth that's close at hand when there's a call to be made can be a real life saver. There's no mistaking the implication of this cartoon.

The telephone companies are alert to the benefits of phone booth service in all kinds of places . . . indoors and outdoors, on highways and by-ways.

Yes, even on the city's sidewalks . . . as represented in the photograph at the left.

SEE OUR CATALOG IN SWEET'S

INDEPENDENT

Sherron ACOUSTIC T SEE-THRU

There's a Sherron booth for every location and budget in either zinc coated or stainless steel

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VNL . . . Over-all Tests

Part 2. How to make Impedance Compensator Adjustments, Echo Return Loss and Singing Point tests.

By DOUG PLASKETT*

IN PART 1 of this article (TELEPHONY, May 21), we discussed the basic tests that are made on the line facilities in preparation for Via Net Loss (VNL) operation. While these tests are being made, other men are testing and accepting additional equipment and modifying the existing trunk relay equipment for VNL options. A transmission engineer will have calculated new net loss figures for the intertoll and terminal trunks. As a result of extensive studies and analysis of the toll plant and routing patterns, a simple method has been worked out for determining via net losses.

This method can be summarized as follows:

VNL = VNLF × L + A + B where
VNL = Via net loss in db.
VNLF = Via net loss factor in db per mile. This factor is derived from the relationship between the variations in tolerance to echo, terminal return loss and round trip circuit loss.
L = Circuit length in miles.
A = 0.4 db, an allowance calculated by statistical analysis for deviations of circuit loss from the design value due to small engineering errors, individual circuit differences, etc.
B = This value is added to an intermediate link which terminates in a two-wire office not having suitable return loss conditions. The value adds to the ultimate net loss figure for the circuit.

Terminal links or tributary trunks that connect an end office (Class 5) to a toll switching office have a design value of VNL + 2 db (VNLF × L + A + 2 db). A local subscriber's circuit connecting to a VNL toll circuit requires a fixed 2 db pad (in the toll switching trunk circuit) to insure a minimum loss of 2 db. Local circuits with less than 2 db loss (operator's telephone circuit, testboard telephone circuit, etc.) will require a fixed 2 db pad.

Impedance compensators are required on loading systems having cut-off frequencies of about 3,500 cycles or lower. The higher cut-off frequencies do not require compensators, since the impedance at 3,000 cycles does not depart much from the 1,000-cycle value. Impedance compensators are wired between the toll entrance cable and the primary test jacks. The compensator consists of a 44 MH loading coil in series with the ring and tip conductors of the line. The line side of the compensator contains an adjustable capacitor that is used to make the .5 cable-end section look more like .8 of a full section. The impedance of a .5 end section increases considerably as the frequency increases, resulting in an impedance mismatch at higher frequencies. The resistive component of loaded cable impedance looks most constant at voice frequencies if the end section is .2 or .8 of a full section.

In addition to the compensator, a low frequency corrector is normally used on 22 and 24-gauge H88 cable to improve the return losses at 300 to 500 cps. A high frequency corrector may also be required on facilities having a low cut-off frequency. These correctors need no adjustment except for 22 or 24-gauge use.

There are several methods of determining how much capacity should be strapped into the compensator. Probably the most accurate method would be similar to the structural return loss test outlined in Part 1. Since it is the higher frequencies we are concerned with, a 2,000-cycle oscillator is used. The oscillator is connected to the transmit path of the test hybrid and a transmission measuring set is connected to the receive path. Short circuit the two-wire line side of the hybrid to produce a zero return loss reading (reference value) on the measuring set. When the short circuit is removed and the line is connected, the difference between the TMS reading and the reference value is the return loss at 2,000 cycles.

This return loss can be made greater if a variable condenser is connected across the A and C lugs of the compensator and capacity added. The loss will continue to increase until a peak is reached and passed. The amount of capacity required to make the peak is the value recorded. This test should be made with negative impedance repeaters wired in the circuit.

Tests can be made on a sampling basis if large cables are involved. An accepted method of sampling is to test five pairs in each cable complement and, if at least one variation from the average is noted, test five more pairs. Continue to test five pairs at a time until all five appear similar. The average value of the tests taken is then considered the compensator capacity required for that cable complement.

Circuit order personnel can now cut hybrid coils, repeaters, terminating sets, etc., onto the approved line facilities. These trunks should be over-all tested for correct net loss at 1,000 cycles. Correction should be allowed for temperature effect on the line. If the measured net loss is within 1 db of the specified net loss, the repeater gains can be adjusted to make the net loss meet the requirement.

Office Balance Tests

When an intertoll call is switched through a Class 4 office, the through-office path should always look about the

*Mr. Plaskett is with the Bell Telephone Co. of Canada at Kitchener, Ontario. For 13 years, he has worked in construction, installation and repair departments. Before working on signaling developments, he was responsible for voice transmission maintenance. During this time he was involved in two cuts to VNL.

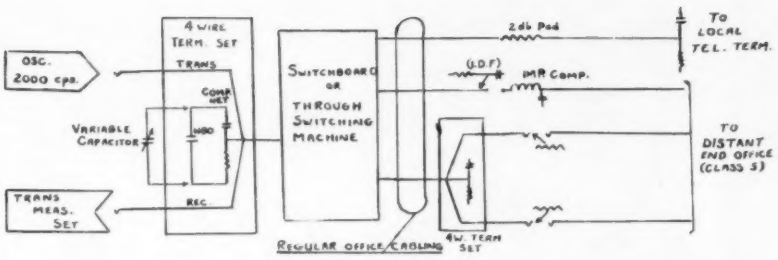

Fig. 1. Test arrangement to determine the amount of capacity required in the NBO to balance average Class 4 office cabling. Resistor-condenser terminations are placed so as to include all regular office cable.

same regardless of the path used. Due to office cables of different lengths and capacity, it is possible for these paths to vary considerably. The office cable capacity is balanced by a network building out (NBO) capacitor connected across the four-wire terminating set compromise network. Our test must determine the average value at which this NBO will be strapped.

A schematic of the test is shown in *Fig. 1*. It is important that the resistor-capacitor termination should equal the resistance of the compromise network. The termination is placed so as to include all of the regular office cabling, preferably at the distributing frame. Capacity is then added across terminals A and C of the NBO until a maximum return loss figure is noted on the transmission measuring set. A sampling of at least five similar readings should be taken on each different group of through office paths. From these sample values, an average value is determined.

The spread between the highest and lowest value should not exceed .025 mfds. If, for example, the largest value was .040 and the lowest was .005, the average would be computed, using the difference between .040 and the requirement .025 (.015) as the lower value. The average would then be .040 + .015 ÷ 2 = .028 mfds. All the office NBO's would be strapped for .028 mfds. The groups measuring below our calculated minimum of .015 will require additional capacity in the office cabling to bring them up to the .028 mfd average. This additional capacity can be added into the drop building out (DBO) capacitor.

Terminal Balance Tests

The tests used to indicate the degree of terminal balance are the echo return loss and the singing point tests. The test arrangement *(Fig. 2)* is similar for both and they are usually done at the same time. Final repeater gains should be set and specified net loss should be close to requirement before beginning these tests.

The 100 test termination in CDO's and the sing test termination in manual switchboards should be changed from 600 ohms and 2 mfds to 900 ohms and 2 mfds. This value more closely resembles an average telephone subscriber termination. This termination is required for both the echo return loss and singing point tests. At the switching office, a four-wire terminating set is connected through the switchboard to the different terminating trunks. The path from the terminating set through the office and terminating trunk equipment should resemble the path taken by a traffic connection. Incoming trunks, such as recording completing or one-way inward circuits, will have to have the connection initiated from the distant end office.

The noise generator is used on this test because it will produce all of the frequencies within the voice echo band and will permit a single reading. A short circuit is placed across the two-wire output of the terminating set to produce an all-power reflected, zero return loss condition at this point. The output of the generator can now be adjusted to produce a reference value on the noise measuring set (NMS). When the short is removed and the trunk is connected, the difference between the reference value and the NMS reading is the echo return loss.

The singing point can now be observed by disconnecting the noise generator and NMS and connecting a singing point test set or equivalent across the four-wire side of the terminating set. The singing test arrangement should contain a filter that will eliminate singing or oscillating beyond the upper or lower speech band limits. The singing point is the amount of gain required to make the circuit sing, minus the transmit and receive losses of the terminating set. If the singing point value is low, note the approximate singing frequency. It may help later to identify the cause of the trouble. These tests should be made on all circuits to terminating end offices, toll switching, recording completing, local subscriber trunks, etc.

The minimum requirements for echo return loss (ERL) and singing point (SP) tests are as follows:

ERL—Average, 18 db.
84% should be 15.5 db or better.
97.5% should be 13.0 db or better.
100% should be 10.5 db or better.
SP—Average 10 db.
84% should be 8 db or better.
97.5% should be 6 db or better.
100% should be 4 db or better.

If the 900-ohm, 2 mfd termination cannot be made available at the distant end, a telephone set with the handset off hook can be substituted. The minimum requirements would then be lower, an average of 15 db for the ERL and 8 db for the SP tests.

The noise generator should contain a weighting network that shapes the noise output to approximately that of a male voice from an F1 transmitter. Noise, of course, contains all the frequencies within the echo test band (250 to 2,500 cycles) and actually provides an average look at all of the frequencies at once.

A poor balance between the balancing network and the line characteristics will impair the ability of the hybrid coil to separate the receive and transmit paths. Some of the transmitted power will leak across the hybrid into the receive path. The talker then hears an echo in his receiver of what he is saying. The amount of echo current and time delay determines the degree of echo effect. The circuit may sound

(Continued on page 54)

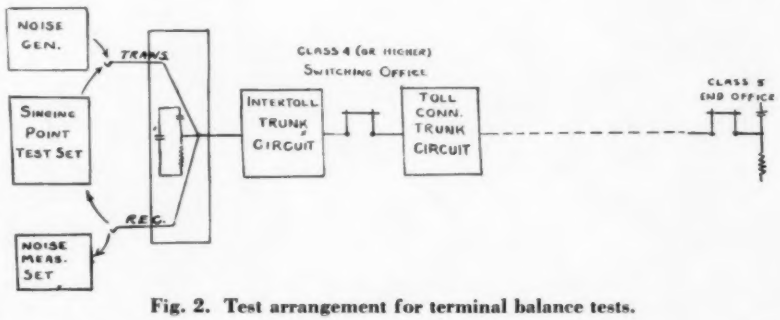

Fig. 2. Test arrangement for terminal balance tests.

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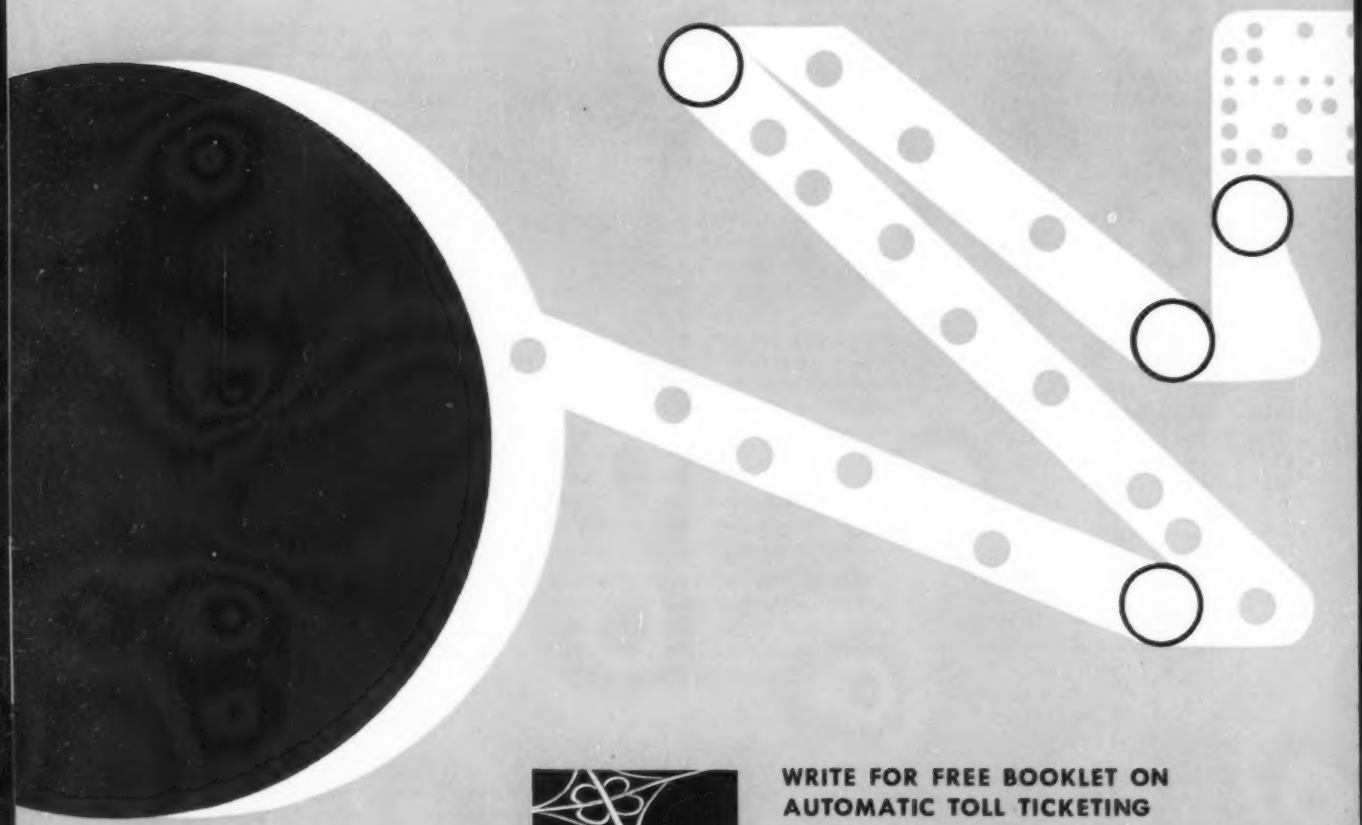
serves 10% of independent



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10% of the Independent dial telephones in the United States are served by Strowger Automatic Toll Ticketing. Introduced in 1948, SATT quickly gained acceptance among Independent telephone companies as the ideal method of handling toll calls without an operator.

Shown at right is a representative list of exchanges served by SATT. Visit any of these exchanges. Ask the owners if SATT has reduced costs and increased income. Convince yourself. Then get in touch with us. We'll be glad to help you in any way possible.

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Sunland
Taft
West Los Angeles

FLORIDA
Ft. Myers

ILLINOIS
Belvidere
Carbondale
Carrolltown
Chillicothe
Des Plaines
Flora
Harrisburg
Jacksonville
Marion
Park Ridge
Pekin

INDIANA
Greencastle
Valparaiso

LOUISIANA
LaRose

MICHIGAN
Adrian
Allegan
Davison
Dowagiac
Erie
Owosso
Temperance

NEBRASKA
Auburn
Beatrice
David City
Wahoo

NEW YORK STATE
Hopewell Junction
Middletown
Monroe

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Washington
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OHIO
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OREGON
Lebanon

PENNSYLVANIA
Gibsonia

TEXAS
Sherman

VIRGINIA
Warsaw

WASHINGTON STATE
Ellensburg
North Bend
Vashon

Courts and Commissions

Oregon Company Gets Raise For Dial Service, EAS

The Mt. Angel Telephone Co. on May 13 was granted permission by the Oregon Public Utility Commissioner to raise its operating revenues by $2,479 (TELEPHONY, Feb. 13). This increase will give the company a 5.88 per cent return on its rate base of $87,618.43.

The Mt. Angel company serves approximately 487 subscribers. With the aid of $64,500 loaned by Mt. Angel residents, it scheduled the cutover of its manual exchange to be effective May 14.

In granting the rate increase, the commissioner determined the company's average plant in service to be $92,642.68. This figure included plant under construction.

Normally, the commissioner said, property under construction is excluded from consideration in rate proceedings. Until actually dedicated to public use, ratepayers are not required, he noted, to pay for financing new construction.

"However," the commissioner stated, "in view of the extraordinary circumstances existing in the instant proceeding, and of the fact that this order will be effective simultaneously with dedication to public use of the property in question, it is fitting that the estimated value of plant-in-service on the cut-over date be determined and used in fixing . . . (Mt. Angel company's) rate base, and plant-in-service, is therefore determined to be $92,642.68."

Rate base was computed as follows:

Average plant in service	$92,642.68
Average materials and supplies	968.50
Working cash	1,728.28
Total	$95,339.46
Less: Average depreciation reserve	7,721.03
Average net plant and working capital	$87,618.43

Under its old rates, the commissioner determined the company had operating revenues of $31,655.02. With the new rates, operating revenue will be $34,116.84.

Taking into account interest on the long-term debt, the company, under old rates would have had a deficit of $316.96. Under new rates, its net income will be $1,278.84.

The new rates will include extended area service with the Monitor exchange of the Monitor Cooperative Telephone Co.

Old and new rates are as follows:

	Old	*New*
One-party business	$5.00*	$6.00
Two-party business	4.35*	5.00
Four-party business	4.00*	4.50
One-party residence	4.00*	5.00
Two-party residence	3.40**	4.00
Four- and ten-party residence	3.35***	3.50***

*Rate shown is for a handset. Charges for a desk telephone are 25 cents lower than this figure, and charges for a wall instrument are 50 cents lower.

In the case of the four-party business service and one-party residence service, the rate shown is for a desk telephone. A wall instrument was billed at 25 cents less.

**This is the rate for a desk telephone.

***Rate shown is for a handset. Charges for desk and wall instruments under the old rates were 25 cents and 50 cents less respectively.

Under the new rates, charges for desk and wall telephones will be 15 cents less.

United of Mo. Gets OK To Issue Stock, Bonds

The Missouri Public Service Commission on May 5 approved the request of the United Telephone Co. of Missouri to issue 60,000 shares of common stock and 2 million dollars worth of first mortgage, 5¾ per cent bonds (TELEPHONY, May 14).

Proceeds will be used to retire indebtedness and finance continued expansion.

The no par value stock will be issued to United Utilities, Inc. to discharge a debt of 1½ million dollars.

Charter Kan. Independent

The Central Kansas Independent Telephone, Inc., Alta Vista, has been granted a telephone and communication service charter. Purley Horne has been named resident agent. Capitalization of $25,000 was authorized.

Approve Rate Increases At Four Minn. Exchanges

The Minnesota Railroad & Warehouse Commission on May 16 granted a rate increase to the West Central Telephone Association, Inc., Wadena.

The West Central association provides dial service through exchanges at Menahga, Sebeka, Verndale and Wolf Lake, serving 565 local and 710 rural stations and 85 service stations.

It is completing a new general office building at Sebeka and also plans to offer extended area service between Verndale and the Wadena exchange of the Northwestern Bell Telephone Co.

Under present rates, it has net operating revenues of $91,275, giving it a net income of $19,431 and providing a 3.04 per cent return on a current value rate base of $638,970. With approved rates, effective on institution of EAS, net operating revenues will increase to $95,171 and net income to $23,170, providing a 3.62 per cent rate of return.

Present rates for the four exchanges are as follows:

One-party business	$7.50
Two-party business	6.75
One-party residence	4.75
Two-party residence	4.25
Four-party residence	3.75
Multi-party rural residence	4.25

Approved rates are:

	Menahga, Sebeka, Wolf Lake	Verndale (including EAS with Wadena)
One-party business	$7.75	$8.00
Two-party business	7.00	7.25
Multi-party rural business	7.00	7.25
One-party residence	5.00	5.25
Two-party residence	4.50	4.75
Four-party residence	4.00	4.25
Multi-party rural residence	4.50	4.75

Incorporate in Nebraska

The Benkelman (Neb.) Telephone Co., Inc. on May 10 filed articles of incorporation with the Nebraska Secretary of State, listing authorized capital stock of $200,000. Incorporators are Jacob H. Raile, Anna S. Raile and Willard E. Raile, all of Benkelman.

Ind. Appeals Court to Decide PSC Pleas, High Court Rules

Appeals from decisions of the Indiana Public Service Commission must be decided by the appellate court, and it cannot transfer the cases to the Indiana Supreme Court, the supreme court has ruled.

In an opinion written by Judge Arch N. Bobbitt, the high court said the appellate court cannot vote evenly on an appeal from the commission and then transfer the case to the high court for determination.

The appellate court in September, 1958, was asked to void a commission order for a long-distance telephone rate increase for 180 companies which had not petitioned for the raise.

The raise had been granted to Indiana Bell Telephone Co. in an order which said all telephone companies in the state could raise their rates to match Indiana Bell.

Public Counselor George L. Diven appealed the ruling to the appellate court, which voted 4-4 on the case and transferred it to the supreme court (TELEPHONY, Apr. 16).

Authorize Pa. Company To Freeze 4-Party Service

Commonwealth Telephone Co., Dallas, has been authorized by the Pennsylvania Public Utility Commission to ban additional four-party installations at a number of its exchanges.

This is part of the company's program to put exchanges on automatic message accounting.

Four-party service has been restricted to present subscribers in Clarks Summit, Dalton, Factoryville, Harding, Lake Winola, Mehoopany, Rush, Nicholson, Springville and 15 other exchanges in northeastern Pennsylvania.

Hear Sale, Stock, Service Requests in Nebraska

The Nebraska Railway Commission on May 24 was to have heard the application of the United Telephone Co. of the West, Scottsbluff, to issue $800,000 in first mortgage 5¾ per cent bonds.

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The commission also, on May 26, was to have heard the application of the Farmers Independent Telephone Co., Red Cloud, to sell, and of the American Communication Co., Inc., Belleville, Kan., to buy the former's property and the Inavale, Neb., exchange.

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In other actions, the commission had, on May 17, authorized the Virginia Cooperative Telephone Co. to sell its property to the Diller Telephone Co., and approved a certificate of convenience and necessity to serve the exchange area of the Virginia company (TELEPHONY, Apr. 23).

Also approved was a government loan of $54,000 to the Diller company for dial conversion and improvements in exchange facilities.

Extended area service between Virginia and the Liberty exchange of Liberty Independent Telephone Co. will be discontinued, effective with the dial conversion. With the dial conversion, rates for Virginia will be as follows:

	Dial Rates
One-party business	$ 8.00
Two-party business	7.25
One-party residence	5.25
Two-party residence	4.75
Four-party residence	4.25
Multi-party rural residence	4.50

•

Also on May 17 the commission authorized the Northwestern Bell Telephone Co. to discontinue four-party service at 22 exchanges on or before Dec. 31, 1960; and at 17 exchanges, on or before Dec. 31, 1963. Four-party service is not now offered at the company's other 60 exchanges.

Southwestern States Gets Raises for Two in Texas

The Southwestern States Telephone Company, Brownwood, Tex., has been granted an increase in local rates in the contiguous Texas cities of Bryan and College Station.

The increase, effective June 1, is as follows:

	Old	*New*
One-party business	$9.00	$12.00
Two-party business	6.75	10.00
One-party residence	5.00	6.00
Two-party residence	4.00	5.00
Four-party residence	3.00	4.00

Both exchanges are dial operated and have a combined total of 13,954 stations.

Iowa Company Sold

The Farmers & Merchants Telephone Co., Linn Grove, Ia., has been sold to the Iowa-Illinois Telephone Co., New London, Ia., it was reported on May 8. The Farmers company was incorporated in 1908. Dial service is planned for Linn Grove.

Hear Sale Request in Neb.

On June 14 the Nebraska Railway commission will hold a hearing on the proposed sale of the Cuming County Independent Telephone Co. by Homer Thompson and C. Elizabeth Thompson to J. E. Nelson and Paul D. Dunlap.

Alaskan PSC Membership Requirements Revised

Governor Egan has signed into Alaskan law a bill to revamp the new Alaskan Public Service Commission.

The new law calls for membership on the three-member commission of persons with education backgrounds in law, engineering and either business administration or accounting.

Governor Egan said the present three-man commission would not necessarily have to be replaced or reappointed before appropriations implementing the new commission become available on July 1.

Under the act, the new commission is directed to report to the 1961 Alaska legislature comprehensive proposals for the regulation of all utilities and public service activities in the state.

Schedule Hearing on Proposed Maine Sale

A hearing on the proposed sale of the Bingham exchange of the New England Telephone & Telegraph Co. to the Somerset Telephone Co. has been scheduled for June before the Maine Public Utilities Commission, it was announced on May 5.

Kenton Quint is president and general manager of the Somerset Telephone Co.

Approve Allocation of SBT&T Rate Raise in Louisiana

In accordance with a recent order of the Louisiana Supreme Court, the Louisiana Public Service Commission on May 5 authorized a revision in Southern Bell Telephone & Telegraph Co. rates (TELEPHONY, Apr. 16).

Revisions were effective both in local service and intrastate long distance rates. Increased long distance rates became effective on May 15, with revised local rates becoming effective by billing periods, beginning May 16.

Based on 1957 volumes, it is estimated that the new rates will provide $1,848,000 in additional intrastate long distance revenue and approximately $1,920,091 in local service revenue. These amounts, added to $1,918,707 already provided by removal of the 10 per cent intrastate toll discount, make a total increase granted of $5,686,798.

The company, prior to the supreme court decision, had asked for a 14-million-dollar raise. The commission denied the company's main application but did allow $1,918,707, which action was upheld by the district court of East Baton Rouge.

The rate schedule effective May 16 includes base rate area extensions

which reduced annual revenue from mileage charges by approximately $500,000.

Examples of old and new rates are as follows:

New Orleans	*Old*	*New*
One-party business	$16.25	$17.50
One-party residence	5.50	5.60
Two-party residence	4.40	4.45
Four-party residence	3.60	3.65
Rural residence	3.60	3.65
Baton Rouge		
One-party business	12.00	13.50
One-party residence	4.25	4.35
Two-party residence	3.60	3.65
Four-party residence	3.00	3.05
Rural residence	3.00	3.05
Crowley		
One-party business	7.50	9.00
One-party residence	3.25	3.35
Two-party residence	2.75	2.80
Four-party residence	2.25	2.30
Rural residence	2.25	2.30

Local paystation calls will remain at 5 cents.

Idaho Company Granted $5,034 in Increased Rates

The Aberdeen Telephone Co. recently was given permission by the Idaho Public Utilities Commission to raise its rates by $5,034 annually.

The company, an REA borrower, which provides dial service in Aberdeen and Springfield, had asked for an increase of $22,887.

The commission determined the company's present revenues to be $64,339.47, and net income $1,972.53.

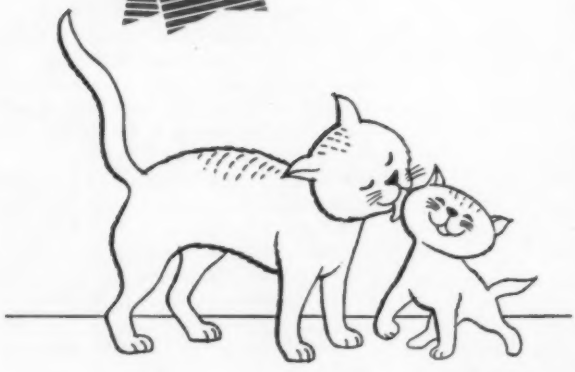
General of SW Milestone Phone Put in Tex. Plant

The General Telephone Co. of the Southwest, San Angelo, Tex., on Apr. 26 installed its 300,000th telephone in an industrial plant, instead of in a home, which is the usual practice. The installation was made at the Aluminum Co. of America (Alcoa) plant, Point Comfort, Tex.

The event was marked by a brief ceremony at the plant where M. L. Johnson Jr., installer-repairman for the company, installed the colored wall telephone. The ceremony was followed with a luncheon attended by Alcoa and

Ben H. Sloane (left), manager of Aluminum Co. of America Point Comfort, Tex. plant, accepts from E. H. Danner, president of General Telephone Co. of Southwest, 300,000th telephone installed by company. Installation was in Alcoa refinery.

PROVED BEST for ease of maintenance



A combination of glass, enamel, anodized aluminum and simplicity of design keep maintenance problems to an absolute minimum.

the BN Booth

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Benner-Nawman, Inc., 3421 Hollis Street, Oakland 8, California.
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General Telephone officials and civic and business leaders from the south Texas area.

At the luncheon, E. H. Danner of San Angelo, General's president, presented Ben H. Sloane, manager of Alcoa's Point Comfort operations, with a plaque enscribed, "Presented to Alcoa in commemoration of the 300,000th telephone placed into service by General Telephone Co. of the Southwest, April 26, 1960." The telephone installed at the plant had a similar inscription.

In presenting the plaque, Mr. Danner pointed out that each organization had almost tripled its operation in the last decade. Alcoa's production capacity grew to 140,000 tons per year, and General increased the number of telephones it serves from 107,000 to 300,000.

OK EAS Rates in Wash. For General of NW, PT&T

The Washington Public Service Commission on May 9 granted the request of the General Telephone Co. of the Northwest and the Pacific Telephone & Telegraph Co. to provide extended area service and to charge higher rates at the two exchanges affected.

These exchanges are the General company's Richland exchange and the Pacific company's Pasco exchange.

Extended area service will also be provided between Richland and General's Kennewick exchange.

Francis Pearson, commission chairman said, "Although the Richland subscribers will experience a monthly increase in exchange rates, they, in conjunction with the Kennewick subscribers, will experience a combined annual savings of about $148,000 from the elimination of toll charges."

He added that Pasco subscribers will realize a savings of about $62,000.

Old rates, and rates incorporating EAS, are as follows:

Richland	*Old*	*New*
One-party business	$10.75	$13.25
Two-party business	8.75	11.00
One-party residence	5.35	6.30
Two-party residence ...	4.55	5.45
Four-party residence ...	3.95	4.95
Pasco		
One-party business	10.25	11.50
One-party residence	5.10	5.40
Two-party residence ...	4.24	4.45
Four-party residence ...	3.60	3.75

Approve Stock Issue in Ark.

Four States Telephone Co., Brownwood, Tex., on May 9 received Arkansas Public Service Commission approval to issue 20,000 shares of common stock at $10 par value to its parent company, Southwestern States Telephone Co.

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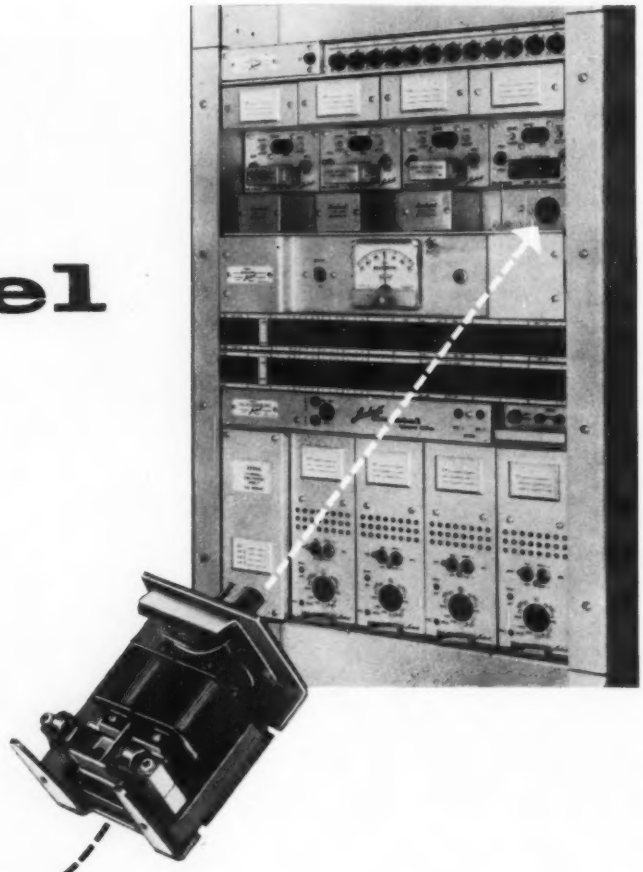


THE PTW POLAR RELAY, for instance...

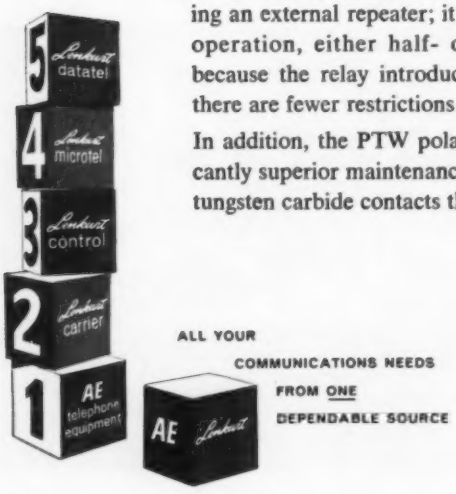
Lenkurt Type 23A Datatel telegraph carrier equipment incorporates advanced design features that provide wider latitudes of operation.

For instance, each 23A loop unit employs a PTW polar receiving relay that has a number of advantages over electronic keyers. Its use permits various polar arrangements without requiring an external repeater; it allows back-to-back operation, either half- or full-duplex; and because the relay introduces no voltage drop, there are fewer restrictions on loop length.

In addition, the PTW polar relay has a significantly superior maintenance-free life. It has 3/16" tungsten carbide contacts that are immune from pitting and contact build-up, and features an Alnico permanent magnet that retains its flux indefinitely.

Type 23A has the added advantage of being fully transistorized. Dissipation is only 2.5 watts per channel, and the equipment can be operated directly from any 48-volt d.c. source. A multimeter and VTVM are normally the only test instruments required for servicing.

For the full story on Lenkurt Datatel or companion equipment, call your Automatic Electric representative, or write Mr. T. B. Collins, Director, Carrier & Radio Sales, Automatic Electric Sales Corporation, Northlake, Illinois.



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IN THE NATION'S CAPITAL

Continued from page 18

of the commission. Pertinent comments filed in response to the order in Docket 11866 will also be taken into account in this inquiry.

Still a Vacancy at FCC

As indicated in this department last week, President Eisenhower yielded to the request of the New Jersey attorney, Edward K. Mills Jr., that his name be withdrawn as a nominee to the vacancy on the Federal Communications Commission. President Eisenhower canceled the nomination reluctantly after Mills told him that his life interest in two trust funds created a possible conflict-of-interest problem which he could not remove.

The President's decision was unavoidable under the laws governing the qualifications of FCC members. But the situation deserves attention because it points to a flaw in our statutory policy governing qualifications of regulatory commissioners. It should be said that Mr. Mills conducted himself with good taste and ethical sensitivity in a situation which he could neither avoid nor control.

After all, it was Mills himself who volunteered information to the Senate Interstate Commerce Committee about a lifetime trust which happened to contain some shares in Westinghouse and General Electric. The law says that an FCC commissioner cannot have any pecuniary interest in radio and television businesses. And although radio and television are only incidental parts of the operations of Westinghouse and General Electric, the fact remains that both of those companies are in that kind of business to some extent.

Furthermore the trustees of the life estate refused to sell the shares because there were other beneficiaries besides Mr. Mills. The trustees felt that a sale of the shares at this time would be detrimental to the trust.

So then Mr. Mills offered to give the dividends to charity. But this did not satisfy the Justice Department. It appeared that his estate would still benefit from capital gains. In other words, there was simply no way in which Mills could get rid of this disability and legally qualify for FCC. He had no alternative except to ask that his name be withdrawn.

This situation probably would not happen again in a long time, if ever. But it does show how conflict of interest statutes too stringently drawn can have the effect of depriving the government of otherwise qualified and highly competent public servants from the world of business and the professions. Mr. Mills personally could not control the trust estate if he wanted to do so. But that made no difference under the strict interpretation of the law. The fact that he benefited from the proceeds was sufficient.

Telemetering versus Meter Reading

Poor little Fido is going to become more bored than ever if a recent American Gas Association speaker is correct in his prediction. For years it has been considered a prerogative, if not one of the inalienable rights, of the American dog to amuse himself harassing the monthly meter reader of the gas and electric companies. But the time may come soon when Fido will have to sulk in the basement until the members of the family think up something else to amuse him.

The job of the familiar meter reader would be taken over by the telephone company, thereby forming a union of two or more utility services for a common purpose in the public service. (Electric and water meters might also be read in this manner.) The prediction was made earlier this month by T. G. Humphreys Jr. of the Alabama Gas Corp. of Birmingham, in addressing a general session of the American Gas Association conference on the issue of telemetering. The conference was held in New Orleans, La., May 13.

Telemetering means using machines to read the meters from some central point, Humphreys explained in an interview with newsmen at the New Orleans meeting. "We have not reached the point where we take domestic readings from a central point," he said. "Technically, it is possible to do this, but I believe that telemetering of small, domestic meters is impractical and uneconomical." The inference was, however, that it may become so in the future.

Humphreys said that his company does transmit readings of city-gate stations and large industrial customers to central offices. But, he added, the meter man is more economical for domestic accounts. "In the future, there will probably be some arrangement to use regular telephone circuits at off-peak hours," he said, "so that automatic machines can dial the customer's number and a special number to obtain readings of gas—and perhaps electricity and water meters."

The speaker went on to say: "This information will be fed into a computer which will then prepare the bill."

Although it is possible to produce such a machine now, Humphreys said there must be improvements in the machine that will make its use economical. "Telemetering is a very significant advance in the technology of gas transmission," he said. "Such advances will allow us to maintain adequate service in the face of rising costs."

DEW Line Men Use "Ham" to Talk With Home and Friends

Men who operate the complex radar and radio equipment that makes up America's first line of defense along the Distant Early Warning (DEW) Line also use their electronic "savvy" to keep in touch with their families in the United States and Canada, operating "ham" radio circuits that bring them not only the voices of their wives and children, but friends all over the world.

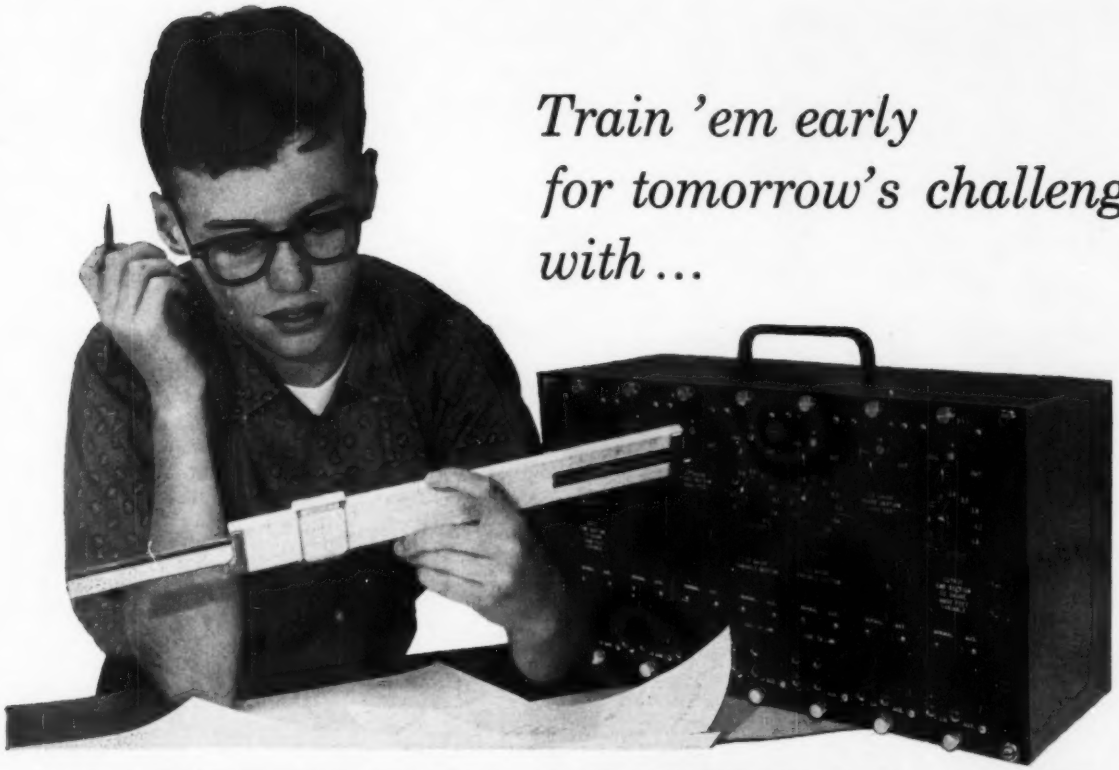
When the public address system at FOX station above the Arctic Circle in Canada blares out an invitation to anyone wishing to speak to New York, New Jersey, Connecticut or Pennsylvania, the response is electric. The average American who lives and works (and sometimes sleeps) a few paces from the nearest telephone would not react the same way. To the DEW-Liner the announcement means contact with the outside world.

The DEW Line, operated and maintained by International Telephone & Telegraph Corp., is a huge electronic web spanning the northernmost reaches of the continent across Alaska and Canada. It is designed to send an early warning in the event of enemy air attack over Arctic regions, alerting defenses to protect cities, industries and military installations in the United States and Canada.

There are no telephone or telegraph facilities for private use by civilians manning the DEW Line. These men spend several months at a time in isolation, separated from their families and friends. They are surrounded by the vast emptiness of the Arctic with its 100-mile-an-hour winds and 60-degree below zero temperatures.

The only way a DEW Liner can talk to his family is via a station's "ham" radio equipment and through the cooperation of a thoughtful amateur operator in Canada or the United States.

Actually, amateur radio is part of DEW Line's electronic equipment. Its primary function is to be used for emergency communication as well as for the coordination of the annual resupply operations. But whenever the equipment is not busy, qualified DEW



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Liners can also use it to contact their families or to have a chat with some unknown "ham" somewhere in the world.

It is obvious that the "ham" radio equipment is among the most popular recreational facilities on the DEW Line. There is always a DEW Liner in the radio shack chatting with a fellow radio operator, asking or answering questions.

Whenever a DEW Line radio fan gets in touch with a cooperative amateur operator near the metropolitan areas of the United States or Canada, he always announces his contact through the station's public address system so that DEW Liners from the area can talk to their relatives and friends for a few minutes. "This sounds pretty simple, but sometimes it's very difficult to make contacts in the United States or Canada," says William S. Cook of Shediac Cape, New Brunswick, who is stationed on Baffin Island.

"Atmospheric conditions in the Arctic are so erratic that you can have excellent contacts with any place on earth *except* Canada and the United States. You have to spend several off-duty hours a day in the 'ham' shack before you can get in touch with someone in Canada who would be willing to make a telephone patch or connection for you and put you in touch with your family."

"Usually 'ham' operators in Canada and the United States do not like making telephone patches for you," says Mr. Cook, whose call letters are VE8NH. "But when you tell them you're on the DEW Line and you want to talk to your family, they are glad to cooperate."

Landon and Mabon Elected AT&T Vice Presidents

S. Whitney Landon, assistant to the president and secretary of the company, and Prescott C. Mabon, assistant to the president, were elected vice presidents of the American Telephone & Telegraph Co., effective June 1.

Mr. Landon will continue as secretary of the company, a post he has held since 1952.

Mr. Mabon has been assistant to the president since 1949. He previously served as an assistant vice president in the AT&T public relations department.

Expansion in Colombia

Compania Ericsson Limitada, L. M. Ericsson's Colombian subsidiary, is to install 46,000 telephone lines in the cities of Bogota and Medellin, Colombia.

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News on New Products

PETITE TELEPHONE—A compact new extension telephone has been announced by the Stromberg-Carlson Division of General Dynamics Corp., and will be available to the Independent telephone industry from all branch warehouses on July 15.

The new instrument, called the "Petite," is modern in design, and is available in five decorator colors—white, beige, pink, blue, and turquoise—according to John H. Voss, vice president and general manager of Stromberg-Carlson's Telecommunication Division.

The "Petite" phone offers many advantages to the operating company and to the subscriber, Mr. Voss points out. Using standard components which have been use-tested for years, many of its parts are interchangeable with other current model telephones. Transmission is high gain, 500-type, and the lightweight handset is identical with other current models.

Stromberg's "Petite" telephone is compact, lightweight, and modern in design. It is available in five decorator colors—white, beige, pink, blue, and turquoise—to harmonize with interior decor.

Stromberg-Carlson's new "Petite" telephone has a dial light which glows softly when the handset is on-hook, then lights up brightly when the handset is lifted from its cradle, for ease of dialing in the dark. A switch in the base allows the subscriber to turn the light off if he wishes.

The "Petite" has a compact illuminated dial, with the numbers and letters inside the fingerwheel. The dial light glows softly when the handset is in the on-hook position, and then lights up brightly, for ease of dialing in the dark, when the handset is lifted from the cradle. A switch in the base of the instrument allows the subscriber

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to turn the light off if he wishes. Illumination is provided by a standard screw-type 6-volt flashlight bulb designed to last 1000 hours. Replacement of the bulb can be done by the subscriber through a slotted screw opening in the base.

According to Mr. Voss, the "Petite" is essentially an extension instrument, with no built-in ringer. If desired, a new separate wall-mounted ringer for superimposed, harmonic or straight-line ringing is available. This small baseboard-mounted ringer has an external two-position switch for loud or soft tone.

Where the "Petite" is used as an extension telephone, a standard terminal block is employed, with a plug-in step-down transformer for the dial light. Where the instrument is used as a main station, the new ringer box serves as the junction box for line termination and a 6-volt ac connection.

The entire base of the "Petite" is covered with a non-skid rubber waffle mat. Bright parts of the instrument are brushed aluminum or chrome. The small-diameter retractible cord, in matching colors, has the new "softer" pull. Request NP1337.

•

UNIVAC III COMPUTER—The new Univac III computer system has been announced by the Remington Rand Division of Sperry Rand Corp. This "solid state" electronic computer is described as having a processing speed nine times faster than its predecessor, Univac II, and offering a 25 per cent increase in operating efficiency.

The term "solid state," Remington Rand explains, refers to the fact that Univac III is made up of components such as transistors and Ferractors whose action depends on the controlled flow of electrons in solid substances. Heat problems and tube failures are thus eliminated, and maintenance is greatly reduced, says the manufacturer.

The new Univac system has a unique program-interrupt feature that automatically tells the computer when its peripheral equipment has finished a task, so that it can instantly be put to work again. The computer can therefore keep all of its associated equipment operating at all times.

This has been achieved, according to the company, by using a printed circuit similar to that in Larc, the computer designed by Remington Rand for the Atomic Energy Commission and shipped recently to the Lawrence Radiation Laboratory in Livermore, Cal.

It is said that the entire contents of a standard letter-size file drawer can be stored on a single reel of tape and read by Univac III in 4.8 minutes. Reading, writing and computing can be carried

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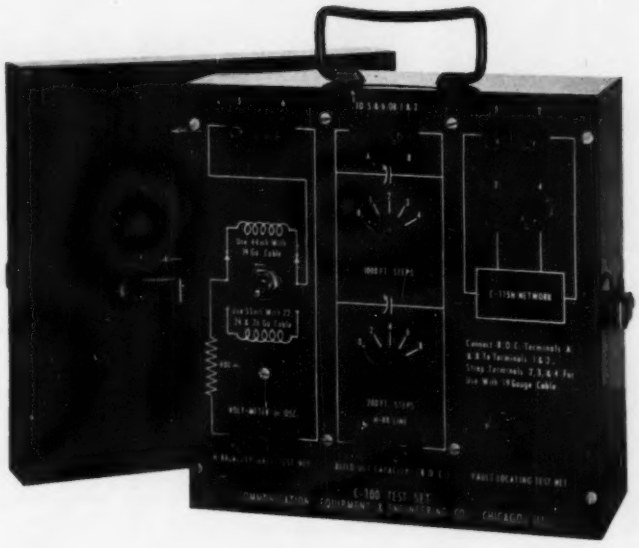

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Officials of the Remington Rand Division of the Sperry Rand Corp. examine a printed circuit component on the company's new Univac III computer system. The circuit is similar to that used in the Larc, the giant computer designed by the company for the Atomic Energy Commission. Left to right are: Jay W. Schnackel, vice president and general manager of the Univac division; Kenneth R. Herman, president of Remington Rand; Dause L. Bibby, executive vice president; and Gordon Smith, director of marketing, Univac Division.

on simultaneously, with a reading and writing rate of 200,000 digits a second. Input and output of data is described as five times faster than with Univac II.

Also, typewriter communication in English can be maintained between the Univac III operator and the computer itself, without the use of complex mathematical symbols for this process.

The magnetic core memories can hold up to 16,384 words and the system can be readily expanded in order to double that capacity, says Remington Rand.

The new Univac III will work with both magnetic tape and punched cards. Its card reader operates at 700 cards a minute, and data will flow from its high-speed printer at the rate of 700 lines a minute. Remington Rand's recently-announced card-punching printer can be used as peripheral equipment.

Request NP1338.

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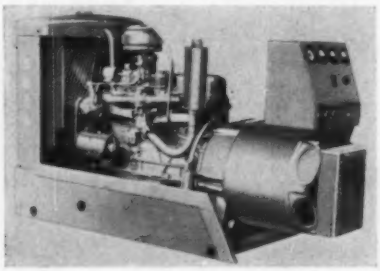
MAGNECITER GENERATOR—The new Magneciter Generator, developed by D. W. Onan & Sons Inc., will now be installed as standard equipment on all 25kw gasoline-driven electric plants, according to the manufacturer.



The new Magneciter Generator with static exciter and voltage regulator provides these advantages, Onan states:

(1) Voltage Regulator has no moving parts, no multiple delicate contact points.
(2) Construction consists of rugged coils and windings, which will not go out of adjustment.
(3) Simplicity of use eliminates hundreds of electrical connections, the commutator and its brush rig and many other "break down" points.
(4) Service—all components are easily accessible as compared to complete dismantling of the generator which is necessary for rotating exciters.
(5) Adjustments—no extra sensitive adjustments are necessary.
(6) Voltage Recovery—rated voltage is restored within *one second.*
(7) Voltage Fluctuation—voltage fluctuation with load changes are less than one half that of rotating exciters.
(8) Longer Life—lighter weight and more compactness indicate this, Onan says.

Onan 25,000-watt gasoline plants (Series 25EC) are *complete* electric generating sets, for standby as well as primary applications. Request NP1339.

Democracy Serves the Many

"That is the best government which desires to make people happy, and knows how to make them happy. Neither the inclination nor the knowledge will suffice alone; and it is difficult to find them together. Pure democracy and pure democracy alone, satisfies the former condition of this great problem."—MACAULAY.

PROFIT MANAGEMENT

Continued from page 22

which leaves the central office, the feeder cables which fan out from the main cable, and the distribution cable which multiples down through the subscriber terminals.

Distribution Cable

Taking the last one first, I have come to believe that distribution cable should be built for the ultimate capacity required in the area it serves. Two 25-pair cables cost 60 per cent more installed than does one 50-pair cable. Two fifties cost 40 per cent more than one 100-pair cable. On top of that, cuts or rearrangements and changes cost a lot of money nowadays and if we play tight with distribution cable, the cost penalty can be very high. I feel sure that it is much cheaper in the long-run, and I am certain that it is better service, to put this distribution plant in for the ultimate.

The main cable is just the opposite, since the percentage spread of cost installed is very much narrowed in these sizes. However, here we are dealing with very expensive space, more often than not in conduit, in quite inflexible routing and with sizes and geography too large for our purpose of control.

In the feeder cable area, we have the best balance between relative costs, flexibility of routing and geographical area. We can usually relieve a feeder area either by reinforcing an existing path, or by going down a new path and cutting the distribution paths in two. Therefore, I should like to explore with you some ideas along the line of using the feeder areas as a basic unit for coordinating revenue and investment control, which is an essential part of profit management.

When relief of a feeder cable has been planned in the past, the usual practice has been to make a forecast of line growth of the area and fix a date when the present capacity would be exhausted. A year or so before that date we engineered and ordered the cable. We got delivery in six months or so and aimed to have it spliced in by the target date.

Engineering $ Are Capital $

Now, the important point in all of this is that engineering dollars are capital dollars and all of this time they are idle insofar as profit is concerned.

Moreover, when the new cable actually is spliced in it is idle also and is expected to be only 50 per cent used over the whole of its planned growth to full capacity use.

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She's cool and comfortable... and You collect!

Here's a hot scoop on a cool young lady! As reported in the ARIZONA REPUBLIC, this lovely young miss finds telephoning a pleasure at this newly installed Outdoor Telephone Canopy — newly installed, that is, by the Mountain States Telephone and Telegraph people in Phoenix, Arizona. They are as pleased as punch that they can finally replace the "hot box" booth with the cool, clean and comfortable GLADWIN OUTDOOR TELEPHONE CANOPY!

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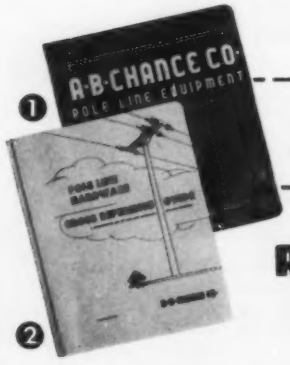
It's as simple as that to install. The top hook slips over the guy wire without the groundman stretching. A single bolt at the bottom fastens the guard to the guy rod, the guy wire or the guy loop. Guy guards that are easy to install are easy to get installed where and how you want them.

808 guards are available in 7 and 8 foot lengths in both galvanized steel and aluminum. Turned-in edges give added strength and safety.



Use these Aids to Pole Line Hardware Selection:

1. Chance T-48 Catalog.
2. Pole Line Hardware Cross Reference Guide.

CP59-13

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to try some experiments. We had some feeder areas that were scheduled for relief. We held this up and we let them run until they were about full. We had 10-year forecasts of line growth in these areas and the usual engineering had been done.

Then just before we ran out of lines we called up our customers in those areas and said that we were going to order some new cable for their area and asked if they would like to have an individual line. There is some real psychology behind this because if I say, "Look here, I have some nice individual lines on the shelf—please buy one," they say "No." But if I say "I am planning on getting some and shall I count you in?" they say "Yes."

Nine girls in three days sold out 84 per cent of the 10-year forecast. They raised the per cent of individual line from 19 per cent to 51 per cent—sold extra lines, extensions, colored instruments besides. Plant men sold several primary services to non-users. All of these sales were made on a promise of 60-day delivery.

By pre-arrangement with the factory we received that cable in 12 days, spliced it in and met our commitments.

Profitable from Start

These cables did not go in idle and we did not have to wait for years for a profit. They went in almost fully profitable from the start.

And, do you know something? There is something stimulating about having half of the neighbors with individual lines. We can do the same thing all over again right now.

This is getting revenue dollars close to investment dollars—keeping the stuff "on the shelf" down to a very minimum. It is far more than that. It is the means by which we can control this business and manage it for not only profit but also for service.

Put yourself in the position of the manager of an exchange with, say, 150 feeder cable areas. You can build a plan of positively coordinating sales with feeder cable supply.

You can identify each feeder area as to character and quality, you can maintain actual records of service distribution by classes, you can evaluate the expected growth in family and firms, you can compare areas and evaluate sales potential, you can direct your sales to a purpose, and that purpose is to get your revenue dollars close on the heels of your investment dollars.

Moreover, you can evaluate these feeder sales programs in relation to main cable, central office and building requirements to form an objective program in relation to the money and

people available to do the job. You can meet your service responsibilities.

This is both revenue control and investment control. It is the basic building block of a budget that is something besides guessing.

Local Manager Responsible

Organization-wise, in our company, it follows that the local manager must be responsible for timing and ordering the quantity he needs, when he needs it, and engineering-construction must design and deliver it promptly.

Now, I think I may anticipate some questions as to these propositions and in this connection I should tell you that I am talking to my own people as well as to other independent thinkers in this regard.

Someone is apt to say that we can't work our plant this tight. In the first place, we anticipate a lot of our growth so that we can handle rearrangements economically on a wholesale basis. Also, we couple this plan with distributing plant designed for the ultimate which minimizes the need for rearrangements.

Someone also may ask how it is possible to arrange for immediate delivery of cable. One way to handle this is to warehouse standard feeder cable sizes. It is better to have it in inventory there than all spliced up with the labor cost in it and, maybe in the wrong place. Another way is to arrange with the manufacturer for special delivery, since the inventory of the manufacturer selling to a lot of companies would be much lower than the aggregate inventory of the companies themselves.

It could be that manufacturers would arrange a reasonable price differential for special delivery to cover warehousing and special handling costs.

Finally, the question might arise as to whether a plan of installation of central office equipment might not be worked out which would involve smaller increments at more frequent intervals. I certainly think so and we are working on the possible idea of doing advance cabling but installing switches more or less as we need them.

Expense Control

The manager for profit must also manage expenses.

First of all, I should like to impress upon everyone here that interest paid is an expense and not a profit, as some moderns would have us think. It was not until I heard their arguments on this subject that I understood why my text book on the general subject of the economic order was called "political economy." Mr. Insull was greatly maligned because he embraced this fallacious theory of debt, and laws were passed to prevent a recurrence of such

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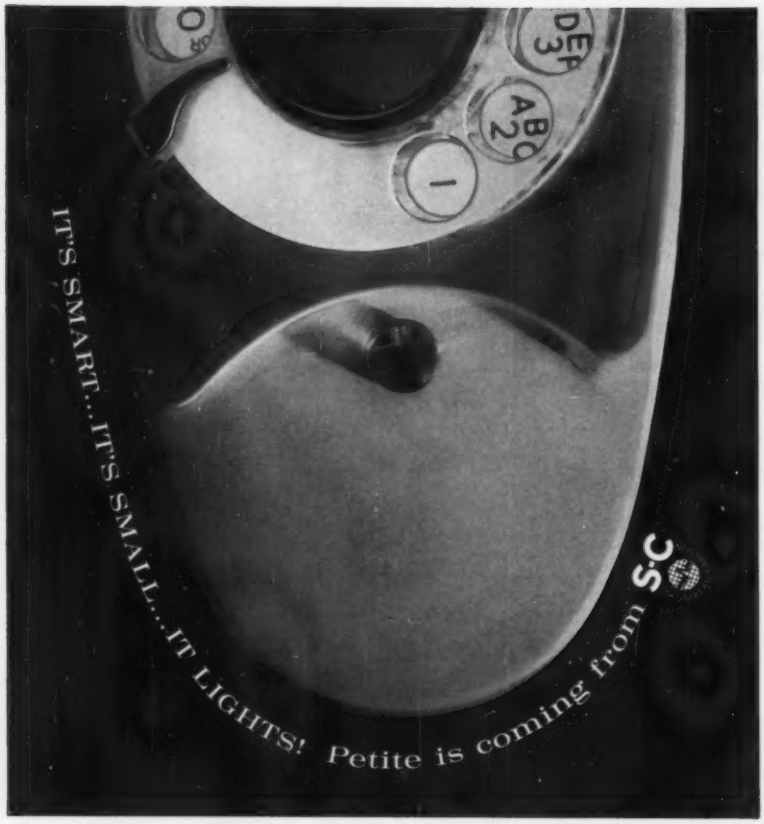

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all-out belief. Our modern political economists who indulge themselves in opposition to necessary rate increases apparently believe that the theory is correct in fixing rates, but is irascibility personified in the actual management of a business.

I want to talk for a minute about depreciation expense. To begin with it goes without saying that, when we reduce idle margins of plant, we improve the ratio of depreciation expense to revenue and in this manner this, of course, is desirable.

On the other hand, I have heard some otherwise able telephone men advocate low depreciation charges as a means of bolstering the rate of return on capital. I don't think I need to tell anyone here that, in the long-run, this jeopardizes both profits and service. In my company the ratio of reserve to plant has dropped in recent years from about 30 per cent to about 15 per cent. This has been due to inflation, of course, since growth had to be taken and replacements made at increased unit costs while depreciation charges were accrued against historical costs.

It can be proven, mathematically that, if depreciation rates had been higher during this inflationary period, telephone rates would not have been increased as much as they have. This is because of the fact that, although depreciation accruals reduce the single year's rate of return, the effect of these accruals in reducing capital requirements is cumulative.

Technology is Factor

I further want to make a plea for higher depreciation rates for telephone companies on the ground that we are much more involved in the technological revolution that is going on all around us than is any other utility. This is because we do not sell merely a staple product. The advance of technology does not change the nature of water or gas or electricity as much as it does the efficiency of production.

You can't pipe conversation in like water and satisfy a communications customer. He looks for improvement in the art to bring him better quality, broader range, greater speed, new services.

Moreover, the customer does not own the terminal facilities as does the user of other utility services. He expects to see the same glamour, styling and convenience in these facilities as he invests in willingly in case of a refrigerator, or bathtub or the family car. Not even Ford could stand up against the public demand for these things and continue a policy to "paint them any color just so it is black."

Glamour, styling, convenience and

the insatiable desire for quality and scope of communications service are the generators of obsolescence. Also they are factors to meet, even create, in the concept of marketing and sales as an essential part of profit management, as was stated before.

Wages Controllable Expense

This brings us down to the area in which expense control, as we ordinarily think of it, is largely concentrated. Ignoring, for the present purpose, the complicated system of accounts which has been adopted for regulatory purposes, we find that these highly controllable expenses are comprised of about 80 per cent wages and directly related costs, and the remaining 20 per cent is in materials and services.

The control of wages boils down to two things, the number of people we have and how much we pay them.

How much we pay them depends primarily upon community wage scales, together with realistic administration and collective bargaining designed to attract and hold the people we want and need. I do not propose to talk at this time about these so-called personnel aspects of management.

However, in the category of how much we pay is the important factor of control of overtime and the premium pay that goes with it.

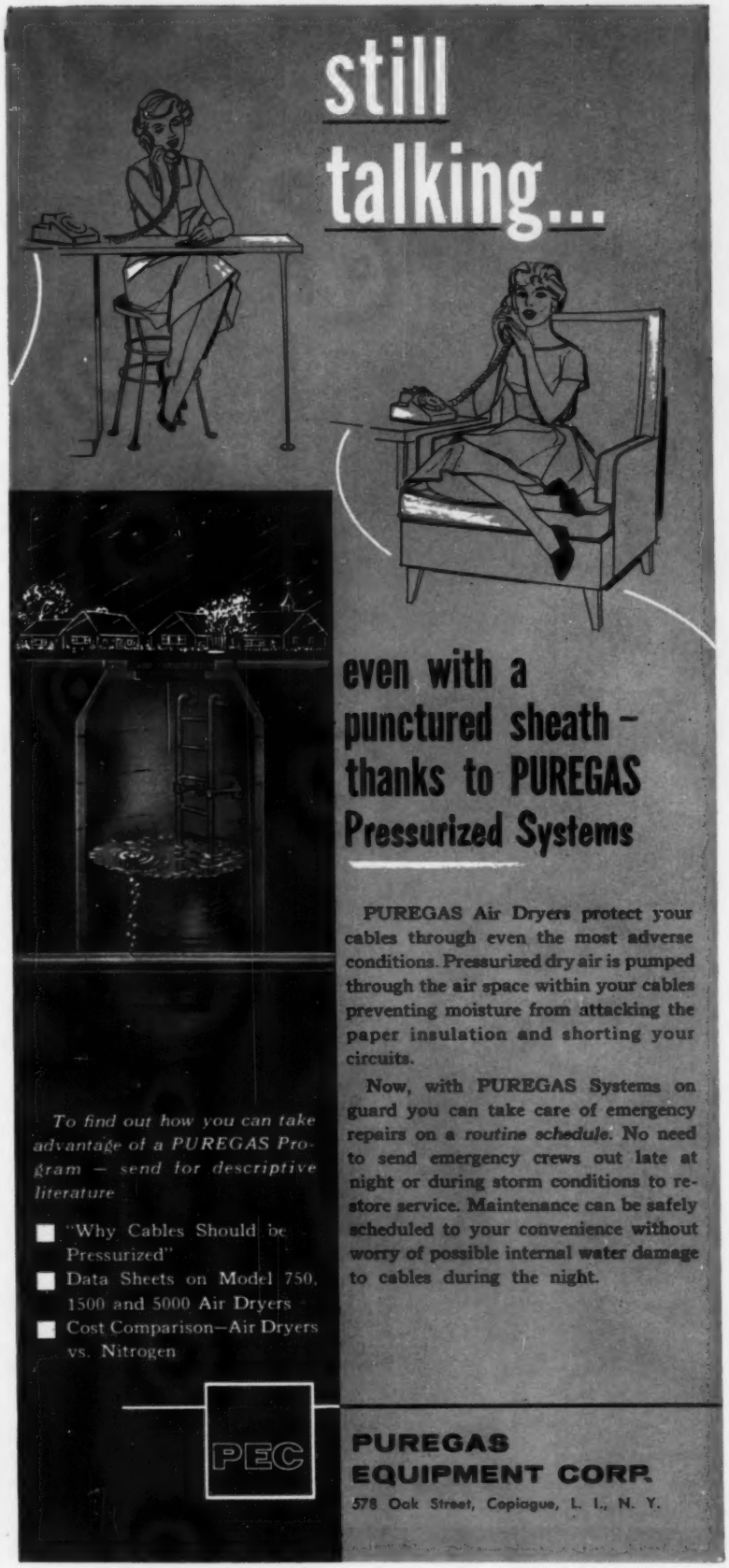
Overtime naturally is justified in emergencies, but we must distinguish in profit management between those emergencies which come upon us because of circumstances beyond our control and those emergencies which come upon us as a consequence of poor planning.

Overtime Control Pays Off

Overtime also is justified as an intelligent means of stabilizing employment; in other words, of avoiding alternate marginal hiring and layoff of people. Beyond this, the strict control of overtime will pay real returns. I have seen instances and so, probably, have you in which overtime was looked upon by first line supervisory people as a favor to be passed on to the people as a means of enhancing take home pay.

The real area of expense control, however, is in the number of people on the payroll. This depends upon how much work there is to do and upon the efficiency with which people work.

The amount of work to be done is quite often looked upon as something that just happens and that we make guesses on and factor as a function of growth in stations. Work-loads, however, can be controlled in many situations. Planned selling instead of just waiting for orders to happen is one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way in which there can be control. Then there is the control that is associated with work volumes that burden us because we don't do things right the first time. I recently saw a study of a department where one-third of the time was spent ineffectively because of doing the job over and over. In this part of expense control, where 80 per cent of the cost is associated with people, the quality of work is a definite part of profit management.

Faulty Practices Cause Work

We can also control work volumes by fixing things that cause work, such as faulty practices or equipment.

The way to get at these things is to actually study what work people do, and why they do it, and to proceed on the basis of the facts at hand.

Given good volume control, the number of people required is governed by the efficiency with which they work.

Along this line there is an item that is important far beyond the amount of money involved. That item is pay for incidental absence. It is a pretty good index to the quality of management housekeeping. Look for the company or department with high incidental absence and you are very apt to find poor performance, high cost and low morale. I do not say that if you fix this item you will fix all else, but I do say that if you fix the other things this item will be low.

The only way that I know of to effectively control the number of people is to make employe budgeting a way of life within an organization just as much as dollar budgeting.

In most companies, the plant budget must be approved all the way up to the president or the board of directors. Salary and wage increases are matters for very top level management decision. But, in many companies, almost anybody can add to the force. I have never heard of a board of directors that wanted, or was requested, to approve an employe budget. I do not say that they should, but this helps to illustrate the point I am making.

Must Be Strictly Enforced

Good profit management requires that there be an employe budget with every job planned and proven in as surely as every unit of equipment is engineered and proven in. And then, it must be strictly enforced in every segment of the business. This is the most important factor in expense control.

There remains for consideration the control of expense for materials, supplies and services. These range all the way from the purchase of pencils to legal fees. . . . Some typical examples are:

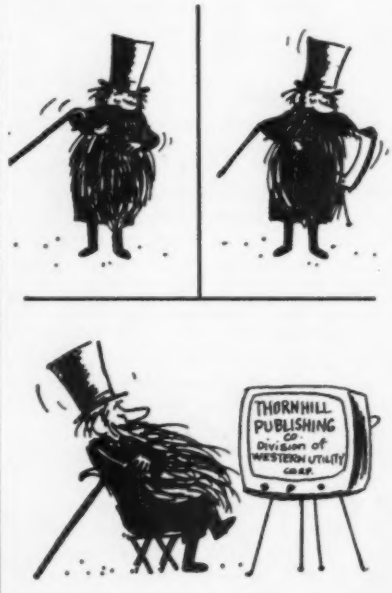
Pole rental	Travel
Advertising	Club memberships
Tree trimming	Painting
Gasoline	Stationery
Printing	Tools
Food	Rent
Consultants	Insurance
Periodicals	Directory delivery

I suggest that we ought to make a list of these things and engage in methodical, periodic investigations to make sure we are getting our money's worth. I fear that we will not come across these things unless we deliberately plan it this way.

My company is in the process of reorganization to better adapt itself to the problems of profit management. I want to emphasize that the best outline, the best system, the best practices are without great merit, unless everyone on the team is imbued with the incentive to achieve great results.

In this, I consider that, at least, four principles must be met. First, of course, you must get and retain only the best people. Second, you must let them know what it is that you are trying to accomplish. Third, you must let them set their own goals. Finally, you must give them the opportunity to err.

We like to complain that our people are not responsible any more. But, actually, we haven't been giving them



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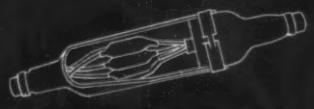

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anything to be responsible for. We have been preoccupied with setting up assembly lines in a service institution.

What we are trying to do now is to be more like the smaller Independent, if you please; to bring the whole operation together as an entity right down at the service front and judge the overall result more, instead of being so obsessed with functional analyses.

Perhaps, however, it may be said that the smaller company is too much lured away from functional analysis by the very appearance of relative simplicity. And, yet, all of the piece parts are there, and all of the principles of profit management which we have discussed, must be adhered to if the greatest success is to be had.

This concludes my remarks on the general subject of profit management, although I am sure that there is much more that could be said—and said better. I have accomplished my purpose if I have been sufficiently provocative to cause each of you to seek your own answers to your own problems in your own way and then, as an association, to search together for the answers to common problems.

VNL OVER-ALL TESTS

Continued from page 31

hollow or, at the worst, may go into sustained oscillations and "sing." A well-balanced hybrid offers higher attenuation (return loss) between the transmit and receive paths and results in weaker echo currents.

The singing point test indicates the frequency at which the circuit is most likely to go into sustained oscillations and the amount of power required to produce the condition. This test covers a wider band (200 cycles to cut-off frequency) than the echo return loss test. When designing a circuit, the transmission engineer allows a margin of 6 db between the working level of the circuit and the calculated singing point.

So far we have been discussing the various tests required to prepare an office for VNL operation. In Part 3 of this article we will discuss what to do when a circuit does not meet transmission requirements. Many of the trouble shooting methods apply to general transmission problems and should help improve any traffic or private line circuit.

(To Be Continued)

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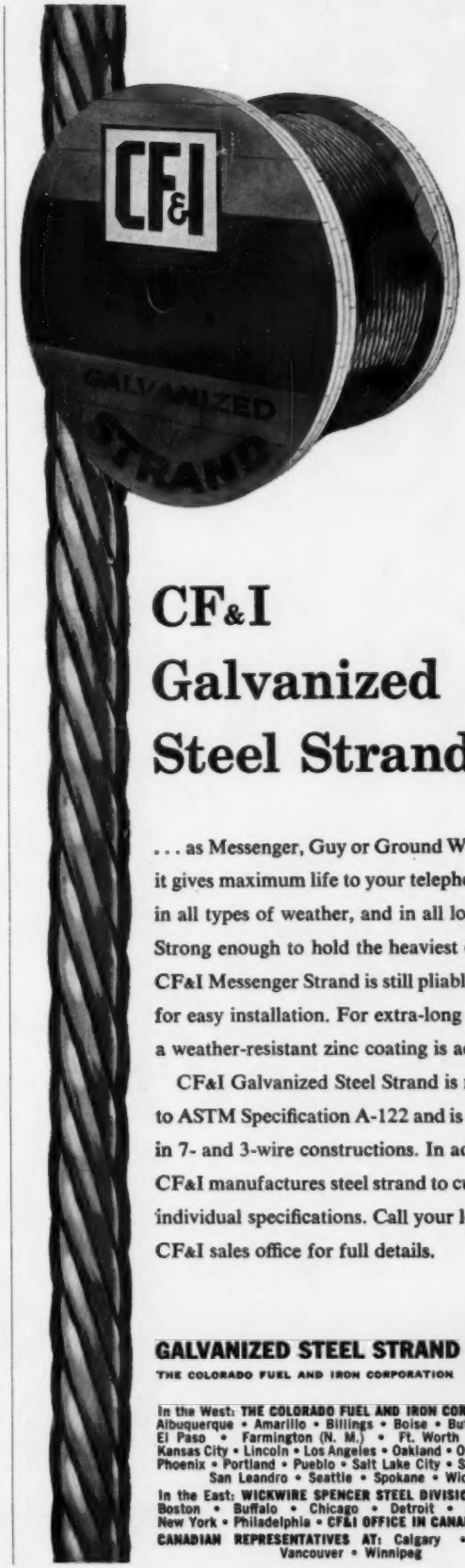

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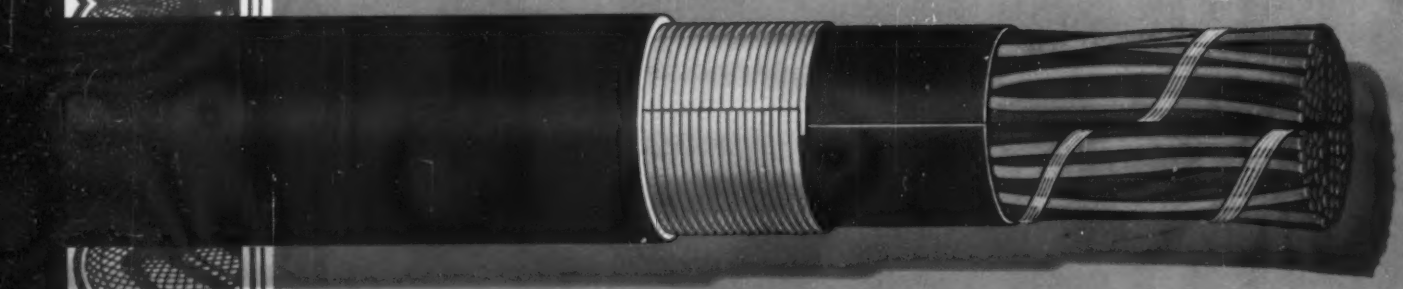

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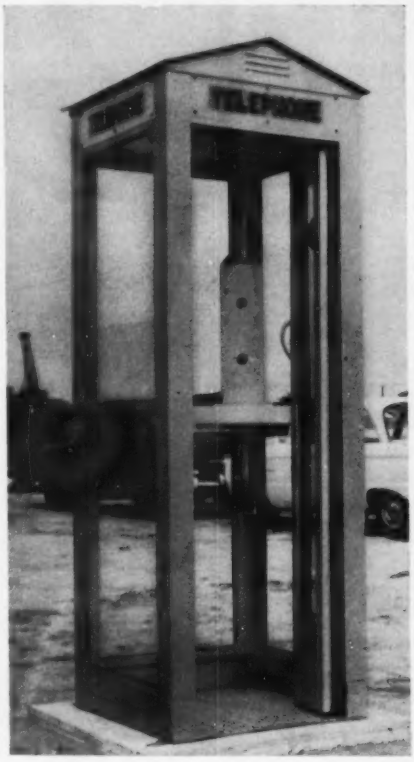

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30	GB706	GB606
42	GB707	GB607
54	GB708	GB608
66	GB709	GB609
DECIMONIC		
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30	GB706	GB606
40	GB711	GB611
50	GB703	GB603
60	GB712	GB612

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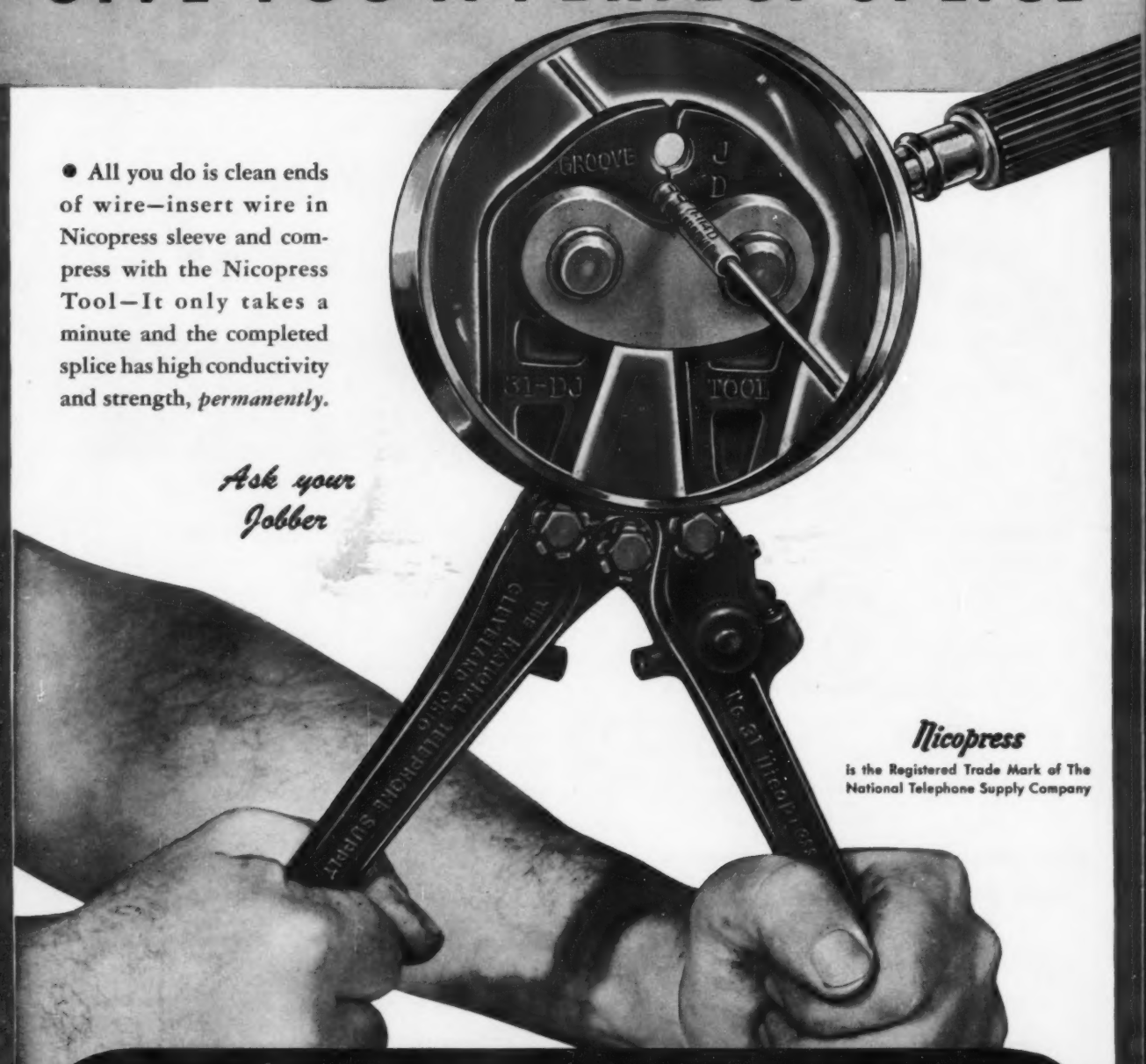
THE *Nicopress* SLEEVE AND THE NICOPRESS TOOL GIVE YOU A PERFECT SPLICE



● All you do is clean ends of wire—insert wire in Nicopress sleeve and compress with the Nicopress Tool—It only takes a minute and the completed splice has high conductivity and strength, *permanently.*

Ask your Jobber

Nicopress
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The National Telephone Supply Company

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